ATTACHMENT 17

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN JOSE DIVISION

CISCO SYSTEMS, INC.,

        Plaintiff,

v.

ARISTA NETWORKS, INC.,

        Defendant.

Case No. 5:14-cv-05344-BLF (PSG)

REBUTTAL EXPERT REPORT OF JOHN R. BLACK, JR.

June 17, 2016

**CONTAINS HIGHLY CONFIDENTIAL MATERIAL
SUBJECT TO PROTECTIVE ORDER**

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John R. Black, Jr.

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REBUTTAL EXPERT REPORT OF JOHN R. BLACK JR.

I.   INTRODUCTION AND BACKGROUND

1.   My name is John R. Black, Jr. I am an Associate Professor of Computer Science at the University of Colorado, Boulder. Arista has engaged me to provide expert testimony to assist the jury on matters related to Cisco Systems, Inc.'s allegations of copyright infringement in this lawsuit.

2.   I previously submitted an expert report on June 3, 2016 in this matter, which I will refer to as my Opening Report. I have been asked by Arista to review and respond to the expert report submitted by Professor Kevin Almeroth dated June 3, 2016, which I will refer to as the Almeroth Opening Report. I understand that Cisco engaged Prof. Almeroth to provide the opinions set forth in the Almeroth Opening Report. I submit this Rebuttal Report to respond to the statements and opinions provided by Prof. Almeroth in his June 3, 2016 report.

3.   I am being compensated for my work in this litigation at the rate of $550.00 an hour. My compensation does not depend in any way on the outcome of this litigation.

4.   At this time, I have not created any exhibits to be used as a summary of, or as support for, my opinions apart from those included with my Opening Report and with this Rebuttal Report. I reserve the right to create additional summaries, tutorials, demonstratives, charts, drawings, tables, and/or animations to explain and illustrate my opinions if I am asked to testify at trial.

5.   I understand that discovery and litigation are ongoing in this case. I therefore reserve the right to supplement my opinions after I have had the opportunity to review deposition testimony or in light of additional documents or information that may be brought to my attention. Further, if Cisco or its experts change their opinions (either explicitly or implicitly) or provide new information, I may supplement my opinions in response. I am aware of, but have not been

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able to evaluate all of, Cisco's materials and contentions produced in this case at the close of

discovery, including new allegations of copyright similarity regarding help descriptions of

commands. I understand that there is a dispute regarding the timeliness of those new allegations.

Should the Court allow those allegations in the case, I may be called upon to provide further

opinions concerning them.

II.   PROFESSIONAL BACKGROUND

6.   My professional background and qualifications have already been set forth in

detail in my Opening Report, and my current CV was attached as Exhibit 1 to my Opening

Report. For brevity, I will not repeat that information here, but instead incorporate information

about my Professional Background from my Opening Report by reference in its entirety into this

Rebuttal Report.

III.   SUMMARY OF REBUTTAL OPINIONS

7.   Cisco accuses Arista of copying various aspects of its CLI, including various

command abstractions[1], "hierarchies," modes, prompts, and responses. In support of these

accusations, Prof. Almeroth offered various opinions in his "Opening Expert Report of Kevin

Almeroth Regarding Copying", executed on June 3, 2016 (herein after "Almeroth Opening

Report"). I disagree with Prof. Almeroth on a number of the opinions offered in his report, and

submit this Rebuttal Report in response to the Almeroth Opening Report.

8.   As I explained in my Opening Report, the asserted and accused aspects of the

CLI, including command modes and prompts, command hierarchies, individual commands, and

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[1] Both Cisco and Prof. Almeroth use the phrase "command expression" to describe the terms listed in Exhibit 1 to Cisco's Second Amended Complaint, Exhibit F to Cisco's discovery responses, and in "Exhibit Copying-2" to the Almeroth Opening Report. In my opinion, the term "command expression" is not a phrase used in the networking industry to describe the terms listed in those exhibits, or to describe the commands entered in a command-line interface, and runs counter to the normal definition of an "expression" in Computer Science. I address this disagreement in terminology further in this Rebuttal Report, and also explain why the phrase "command abstraction" is more appropriate.

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command responses, are functional methods of operations and systems, which I understand are not entitled to copyright protection. Throughout the Almeroth Opening Report, Prof. Almeroth describes the disputed Cisco and Arista CLIs, including the operation of command modes and command hierarchies, in a purely functional manner, while at the same time asserting that the asserted aspects of the CLI are protected by copyright. I disagree with Prof. Almeroth that the asserted aspects of the CLI are protected by copyright, and address that disagreement in further detail this this Rebuttal Report.

9.   I also disagree with Prof. Almeroth's opinion that the selection of the asserted CLI command abstractions is not constrained by external factors, including, for example, the technical limitations of the CLI parser itself, widely accepted practices and descriptive terminology within the computer industry, software standards and compatibility requirements, computer manufacturing design standards, industry programming practices, and other practices and demands of the industry being serviced. Prof. Almeroth also ignores Cisco's own guidelines constraining the addition of new CLI commands to Cisco IOS and other disputed operating systems. These considerations, which I understand are central to the *scenes a faire* doctrine and relevant to defenses to copyright like fair use, copyright misuse, and the short words and phrases doctrine, are ignored by the opinions presented in the Almeroth Opening Report. My disagreements with Prof. Almeroth on these issues are set forth in further detail in this Rebuttal Report.

10.   I also address Prof. Almeroth's identification of the asserted elements of the Cisco IOS CLI,[2] which differs in several respects from the asserted elements identified by Cisco in its

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[2] Unless otherwise noted, references to the Cisco IOS CLI are intended to include other Cisco operating systems identified in Prof. Almeroth's Exhibits to the Almeroth Opening Report, including for example Cisco IOS, CIsco IOS XR, Cisco IOS XE, and Cisco NX-OS. *See, e.g.*, Almeroth Opening Report at Exhibit Copying-2.

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discovery responses. For example, there are 508 disputed CLI command abstractions in "Exhibit Copying 2" to the Almeroth Opening Report (the exhibit itself is numbered to 509, but entry number 57 is blank), which is different from the list of 516 CLI command abstractions in Exhibit 1 to Cisco's Second Amended Complaint, and 514 CLI command extractions in Exhibit F to Cisco's responses to Arista's Interrogatories. Other copyright assertions also differ from what Cisco identified during discovery, which I address in further detail in this Rebuttal Report.

11.   Lastly, I address several factual misstatements in the Almeroth Report, as well as points of disagreement between Prof. Almeroth's opinions and my opinions relating to Cisco's copyright infringement assertions and Arista's defenses to those assertions. This includes, but is not limited to, responding to Prof. Almeroth's discussion of user documentation copying, and rebutting Prof. Almeroth's unsupported and new insinuations that Arista copied Cisco source code. Other disagreements are discussed in detail below.

IV.   INFORMATION CONSIDERED

12.   I considered my Opening Report and all information cited therein and listed in Exhibit 2 to my Opening Report to prepare this Rebuttal Report. I also considered the Almeroth Opening Report and the documents, materials, testimony, and other information cited within the Almeroth Opening Report to prepare this Rebuttal Report. A list of additional materials I considered to prepare this Rebuttal Report is attached as **Exhibit 6**.

V.   LEGAL STANDARDS

13.   A discussion of the legal standards that provide context for my opinions below was already provided in my Opening Report. In that discussion, I addressed (1) copyrightability and the scope of copyright protection; (2) the merger and *scenes a faire* doctrine; (3) the short words and phrases doctrine; (4) fair use; and (5) copyright misuse. I incorporate that prior

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discussion regarding my understanding of the relevant legal standards from my Opening Report into this Rebuttal Report.

VI.   REBUTTAL OPINIONS REGARDING CISCO'S INCONSISTENT AND SHIFTING COPYRIGHT ASSERTIONS

14.   I note at the outset of this Rebuttal Report that the copyright allegations in the Almeroth Opening Report differ in several respects from the copyright allegations disclosed by Cisco during fact discovery and in Cisco's Second Amended Complaint. Given those differences between Prof. Almeroth's opinions and Cisco's discovery responses, I reserve all rights to respond to and provide an opinion on any copyright allegations that Cisco did not clearly and consistently disclose in its discovery responses, and that Prof. Almeroth did not clearly address in the Almeroth Opening Report.

15.   As noted above, Prof. Almeroth lists 508 disputed CLI command abstractions in "Exhibit Copying 2" to the Almeroth Opening Report (noting again that while the exhibit is sequentially numbered to 509, entry number 57 is blank), which differs from the 516 CLI command abstractions in Exhibit 1 to Cisco's Second Amended Complaint, and 514 CLI command extractions in the most recent version of Exhibit F to Cisco's responses to Arista's Interrogatories. Specifically, I note that:

- ○   Prof. Almeroth's provides no opinion regarding the "clear ip mfib fastdrop" command abstraction, which appeared in Cisco's most recent Exhibit F to its interrogatory responses, and "clear ip mfib fastdrop" is not listed anywhere in Exhibit Copying-2.

- ○   Prof. Almeroth provides no opinion regarding the "default-metric (OSPF)" command abstraction, which appeared in Cisco's most recent Exhibit F to its interrogatory responses, and "default-metric (OSPF)" is not listed anywhere in Exhibit Copying-2.[3]

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[3] As noted in my Opening Report, there is no valid Arista EOS CLI command that starts with the keywords "default-metric" for OSPF version 2. *See* Opening Report ¶ 493.

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- ○ Prof. Almeroth provides no opinion regarding the "ip-community-list standard" command abstraction, which appeared in Cisco's most recent Exhibit F to its interrogatory responses, and "ip-community-list standard" is not listed anywhere in Exhibit Copying-2.[4]

- ○ Prof. Almeroth provides no opinion regarding the "max-connections" command abstraction, which appeared in Cisco's most recent Exhibit F to its interrogatory responses, and "max-connections" is not listed anywhere in Exhibit Copying-2.[5]

- ○ Prof. Almeroth lists the "show ip bgp neighbors" command abstraction twice in Exhibit Copying-2 in the Cisco column, and accuses two different Arista EOS CLI command abstractions as copying it. I note that the Cisco command abstraction "show ip bgp neighbors" is listed only once in Exhibit F to Cisco's interrogatory responses, with only a single author, despite now being listed in Exhibit Copying-2 as two different command abstractions (with different associated Cisco IOS versions).

- ○ Prof. Almeroth provides no opinion regarding the "show qos maps" command abstraction, which appeared in Cisco's most recent Exhibit F to its interrogatory responses, and "show qos maps" is not listed anywhere in Exhibit Copying-2.

- ○ Prof. Almeroth provides no opinion regarding the "show vlan internal usage" command abstraction, which appeared in Cisco's most recent Exhibit F to its interrogatory responses, and "show vlan internal usage" is not listed anywhere in Exhibit Copying-2.

- ○ Prof. Almeroth provides no opinion regarding the "vrrp track" command abstraction, which appeared in Cisco's most recent Exhibit F to its interrogatory responses, and "vrrp track" is not listed anywhere in Exhibit Copying-2.

I assume for purposes of this Rebuttal Report that the list of disputed and accused command abstractions in Exhibit Copying-2 to the Almeroth Opening Report supersedes Exhibit F to Cisco's interrogatory responses, and Exhibit 1 to Cisco's Second Amended Complaint. **I have attached revised versions of the Appendices to my Opening Report** to reflect the modified allegations in Prof. Almeroth's opening report (*e.g.*, removing command abstractions that Prof.

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[4] As noted in my Opening Report, there is no valid Arista EOS CLI command that starts with the keywords "ip-community-list standard." *See Id.* ¶ 493.

[5] As noted in my Opening Report, the only valid Arista EOS CLI command that starts with the keyword "max-connections" is used for an innovative Arista feature called LANZ (Latency Analyzer). *See Id.* ¶ 495. Cisco devices do not have a feature called LANZ. *Id.* Moreover, as noted in my Opening Report, there is no evidence that Cisco ever supported a "max-connections" command. *Id.* ¶ 496.

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Almeroth omitted from his report, and adding numbering to match Prof. Almeroth's charts).[6]

Should Cisco be permitted to change their copyright assertions yet again, I reserve all rights to

respond to those new or different allegations.

16.   The Almeroth Opening Report also identifies eleven so-called command

"hierarchies" that, based on Prof. Almeroth's understanding of the case, represent the hierarchies

"that Cisco contends that Arista copied [.]" *See* Almeroth Opening Report ¶ 186. Specifically,

Prof. Almeroth states that hierarchies identified by"aaa", "bgp," "clear," "dot1x," "ip," "ipv6,"

"neighbor," "show," "snmp-server," "spanning-tree," and "vrrp" were copied by Arista, and he

lists out the individual command abstractions that start with those eleven first-keywords in

Exhibit Copying-5 to the Almeroth Opening Report. *Id.* ¶¶ 186, 194. Prof. Almeroth also cites

to "Amended Exhibit D1-D26 to Cisco's interrogatory responses" but limits his discussion to

only the hierarchies beginning with "aaa", "bgp," "clear," "dot1x," "ip," "ipv6," "neighbor,"

"show," "snmp-server," "spanning-tree," and "vrrp." (*See id.* ¶¶ 187-193). I therefore assume,

based on Prof. Almeroth's statements in his opening report, that Cisco's assertions regarding

command hierarchies are limited to those eleven so-called hierarchies, and do not include any

accused command abstractions that start with a keyword other than "aaa", "bgp," "clear,"

"dot1x," "ip," "ipv6," "neighbor," "show," "snmp-server," "spanning-tree," and "vrrp."[7] Should

Cisco be permitted to change their copyright assertions with respect to these so-called

hierarchies, I reserve all rights to respond to those new or different allegations.

17.   Moreover, I note that during fact discovery, Cisco did not take a clear position on

whether the accused command hierarchies included an associated "command mode." While

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[6] I have also updated Appendices to account for third-party document productions that occurred at the end of the fact discovery period, including productions by HP, D-Link, and Extreme Networks, and to add totals at the bottom of the charts for ease of reference.

[7] Cisco's Amended Exhibits D1-D26 to its interrogatory responses do not clearly identify these particular eleven command hierarchies as the targets of its copyright infringement assertions.

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Amended Exhibits D1-D26 to Cisco's interrogatory responses show command modes as being at

least associated with certain hierarchies, the corporate witness that Cisco designated to testify

regarding the asserted hierarchies, Phillip Remaker, did not know whether the asserted

hierarchies included command modes. *See, e.g.*, Cisco Corp. Dep. Tr. (Remaker) at 190:16-18

("**Q.** Do you know if the command hierarchies at issue in this lawsuit includes the command

mode? **A.** *I don't know*.") (emphasis added).

18.   In his opening report, Prof. Almeroth now asserts: "Each command hierarchy is

associated with a configuration mode (e.g., the 'enable' EXEC command in EOS and IOS).

What that means is that the command hierarchy can only be used and accessed in that specific

configuration mode. Associating modes with hierarchies adds an additional layer to the

organization and structure of the CLI." Almeroth Opening Report ¶ 189. Given Prof.

Almeroth's opinion that the asserted and accused command hierarchies are tied to specific

command modes, **I have attached revised versions of certain Appendices to my Opening**

Report, as well as Appendix L, to respond to Prof. Almeroth's opinion regarding command

hierarchies, including the addition of command mode information where appropriate.

19.   I also note that Prof. Almeroth's assertions that "[e]ach command hierarchy is

associated with a configuration mode" and "the command hierarchy can only be used and

accessed in that specific configuration mode" (Almeroth Opening Report ¶ 189) are inconsistent

with information shown in Exhibit Copying-4 and Exhibit Copying-5 to the Almeroth Opening

Report. Prof. Almeroth's Exhibit Copying-4 lists different command modes for Cisco IOS, IOS

XE, and IOS XR on the one hand, and NX-OS on the other hand. For example, in NX-OS

versions 5.0 through 6.2, there is no "Privileged EXEC" mode available, while a "Privileged

EXEC" mode is available in Cisco IOS, IOS XE, and IOS XR. *See* Exhibit Copying-4 to the

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Almeroth Opening Report. In other words, certain command modes differ between Cisco IOS,

IOS XE, and IOS XR on the one hand, and NX-OS on the other hand. Despite these differences

in available command modes, Prof. Almeroth's Exhibit Copying-5 lumps together command

abstractions from Cisco IOS, IOS XE, IOS XR, and NX-OS as being part of the *same* command

hierarchies (*e.g.*, the hierarchies list some constituent command abstractions that are only found

in NX-OS, and others that are only found in Cisco IOS). It is my understanding that each Cisco

operating system is separately registered with the Copyright Office, and Prof. Almeroth does not

explain how a mode, command abstraction or other feature of one registered work (e.g., a

version of IOS) can be part of a hierarchy including elements from the different registered work

(e.g., NX-OS). Therefore, while Prof. Almeroth contends that "[e]ach command hierarchy is

associated with a configuration mode," Exhibit Copying-5 does not clearly show that association.

20.   In fact, Exhibits D1 to D26 to Cisco's interrogatory responses contradict Prof.

Almeroth's assertion. Exhibits D1 to D26 appear to show that "ip" hierarchies can be associated

with multiple command modes. *See, e.g.*, Exhibit D10 to Cisco's Interrogatory Responses

(showing, for Cisco IOS 15.0, some "ip" commands in "global configuration mode" and others

in "interface configuration mode"); Exhibit D24 to Cisco's Interrogatory Responses (showing,

for Cisco NX-OS 5.0, some "ip" commands in "global configuration mode" and others in

"interface configuration mode"). In contrast, Exhibit Copying-5 to the Almeroth Opening

Report merely identifies a one "'ip' hierarchy" starting on Page 12, consisting of 92 asserted

command abstractions that start with "ip".[8] Nowhere in Exhibit Copying-5 does Prof. Almeroth

identify a "specific configuration mode" associated with the "ip" hierarchy he identifies, and

Cisco's own Exhibits D1 to D26 to its interrogatory responses suggest that there is no single

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[8] Exhibit Copying-5 to the Almeroth Opening Report lists "ipv6 access-list" as being part of the "ip" hierarchy on
Page 34. I assume that Prof. Almeroth's inclusion of "ipv6 access-list" in the "ip" hierarchy was in error.

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command mode associated with the "ip" hierarchy shown on pages 12 to 34 of Exhibit Copying-5 to the Almeroth Opening Report.

21.   In sum, Exhibit Copying-5 to the Almeroth Opening Report fails to identify what "specific configuration mode" is supposedly associated with each asserted and accused command hierarchy, and given that each command hierarchy (per Prof. Almeroth's Exhibit Copying-5) consists of a mashup of different asserted command abstractions supported by varying combinations of Cisco IOS, IOS XE, IOS XR, and NX-OS, Prof. Almeroth has not articulated what single "specific configuration mode" Cisco contends is associated with each hierarchy in Exhibit Copying-5. Indeed, *nowhere* in Prof. Almeroth's opening report does he identify any command modes associated with the accused hierarchies in the Arista EOS CLI, or even any command modes associated with any accused command abstractions purportedly supported by the Arista EOS CLI. Should Cisco or Prof. Almeroth be permitted to clarify these allegations regarding the association of particular command modes (or "specific configuration mode[s]") with the accused or asserted command hierarchies and abstractions, I reserve all rights to respond.

22.   I also observe that Exhibit Copying-4 lists the same nine Cisco IOS (including NX-OS) command modes and associated prompts that Cisco identified during fact discovery in Exhibit C to its interrogatory responses (namely, "User EXEC" twice, "Privileged EXEC" twice, "Global Configuration" twice, "Interface Configuration" twice, and "EXEC" once), as well as the corresponding Arista EOS command modes and prompts that Prof. Almeroth contends were copied. While Prof. Almeroth also vaguely states in his opening report that "Cisco alleges that Arista's use of these command modes and prompts extends to interface-, feature-, protocol- and other more specific command modes and sub-modes, with associated prompts" (Almeroth

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Opening Report at ¶ 177), I have seen no copyright allegations from Cisco or Prof. Almeroth

beyond the nine command modes and associated prompts listed in Exhibit Copying-4 to the

Almeroth Opening Report and in Exhibit C to Cisco's interrogatory responses. Therefore, I will

focus my opinions on only those nine command modes and prompts that Cisco and Prof.

Almeroth have actually identified.

23.   I note, however, that Arista EOS supports many more command modes and

prompts than the four identified and shown in Exhibit Copying-4 to the Almeroth Opening

Report. For example, Arista EOS supports an "Extended Command Mode Prompt" that is

different from the accused EOS command prompts and similar to the prompt formats used by

some third-party vendors. *See* CSI-CLI-06302874 (Arista EOS User Manual, Version 4.15.3F)

at 308; *see also* Amended and Original Appendix C. Examples of Arista EOS extended

command mode prompts include:

- ○   "(config-if-ET15)#" for Ethernet Interface Configuration Mode

- ○   "(config-if-Vl24)#" for VLAN Interface Configuration Mode

- ○   "(config-if-Po4)#" for Port Channel Interface Configuration Mode

- ○   "(config-if-Ma1)#" for Management Interface Configuration Mode

CSI-CLI-06302874 (Arista EOS User Manual, Version 4.15.3F) at 308. Arista EOS also

supports at least the following additional command modes and exemplary prompts:[9]

- ○   "(config-acl)#" and "(config-acl-listname)#" for ACL Configuration Mode

- ○   "(config-router)#" and "(config-router-ospf)#" for OSPF Configuration
       Mode

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[9] Where two prompts are shown, the extended command mode prompt is shown second. Some command prompts include dynamic information that will differ depending on what is being configured. For example, the "(config-mode-sysuser)#" command prompt is specific to the "sysuser" role being configured. If a different role is being configured, the prompt will be different.

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- ○ "(config-router)#" and " (config-router-bgp)#" for BGP Configuration Mode

- ○ "(config-mgmt-xmpp)#" for Mgmt-xmpp Configuration Mode

- ○ "(config-mgmt-console)#" for Mgmt-console Command Mode

- ○ "(config-mgmt-ssh)#" for Mgmt-ssh Configuration Mode

- ○ "(config-mgmt-telnet)#" for Mgmt-telnet Command Mode

- ○ "(config-mgmt-api-http-cmds)#" for Mgmt-API Configuration Mode

- ○ "(config-mgmt-security)#" for Mgmt-Security Configuration Mode

- ○ "(config-mgmt-ssh-tunnel-Test)" for Mgmt-SSH-Tunnel Command Mode

- ○ "(config-mgmt-defaults)#" for Mgmt-Defaults Command Mode

- ○ "(config-handler-Eth5)#" for Event-Handler Configuration Mode

- ○ "(config-mode-sysuser)#" for Role Configuration Mode

- ○ "(config-sg-radius-RAD-SV1)#" for Server-Group-RADIUS Configuration Mode

- ○ "(config-sg-tacacs+-TAC-GR)#" for Server-Group-TACACS+ Configuration Mode

- ○ "(config-redundancy)#" for Redundancy Configuration Mode

- ○ "(config-load-balance-profile-LB-1)#" for Load-balance-profile Configuration Mode

- ○ "(config-mlag)#" for MLAG Configuration Mode

- ○ "(config-link-flap)#" for Link-flap Configuration

Id.; *see also id.* at 61-64, 70, 136, 146, 229, 238, 239, 378, 574. This is not an exclusive list, as there are also Interface VLAN Configuration, Interface VXLAN Configuration, Link-State Configuration, Server-failure Configuration, and many other non-accused command modes (and their associated prompts) documented in the Arista EOS User Manual. *See generally id.*

24.   Regarding Cisco's copyright allegations directed to command outputs and user documentation, Prof. Almeroth appears to regurgitate the same allegations that Cisco provided in Exhibits A and E to its responses to Arista's first set of interrogatories in Exhibit Copying-1 and

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Exhibit Copying-3 to the Almeroth Opening Report (the page differences between the discovery

exhibits and Prof. Almeroth's exhibits are attributable to additional citations to Arista EOS user

documentation in Exhibit Copying-1 and Exhibit Copying-3).

25.   As noted in my Opening Report, I also understand that Cisco added new

allegations regarding CLI "Help" text at the very end of the fact discovery period, despite the

fact that the CLI "Help" text that is shown when using the Arista EOS CLI help system is visible

to any user of the Arista EOS CLI (as well as vEOS, a publicly available emulator of the Arista

EOS CLI), and does *not* require the review of any Arista EOS source code. I also understand

that there is a dispute regarding the timeliness of Cisco's disclosure of this new copyright

infringement theory and that no discovery had been taken of it due to its sudden disclosure at the

very end of fact discovery. I reserve all rights to fully respond to these new "Help" text

allegations if Cisco is permitted to assert them.

VII.   INCORPORATION OF PRIOR OPINIONS

26.   In this Rebuttal Report, I have focused on responding to specific points and

assertions made by Prof. Almeroth in his opening report. I have already stated several opinions

on matters relating to Cisco's copyright assertions in my Opening Report, and rather than restate

them fully below, I will incorporate them by reference in their entirety into this Rebuttal Report.

27.   For example, my analysis in my June 3, 2016 Opening Report of the Background

of the Technology (*see* Opening Report at pp. 21-75), Common CLI Usage Across the

Networking Industry (*id.* at pp. 75-238), Technical Issues Related to the Accused Commands (*id.*

at pp. 238-254), Analysis of Issues Related to the Copyrightability of Asserted Parts of the

Copyrighted Works (*id.* at pp. 254-310), Analysis of *Scenes a Faire* Doctrines (*id.* at pp. 310-

322), Analysis of Short Phrases Doctrine (*id.* at pp. 322-324), Analysis of Fair Use Factors (*id.* at

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pp. 324-338), Technical Issues Related to Copyright Misuse (*id.* at pp. 338-339), and Appendices

A through K thereto, directly rebuts Prof. Almeroth's assertions of and opinions regarding

copyright infringement by Arista. Those previously stated opinions are part of this Rebuttal

Report, and direct rebut the assertions made in the Almeroth Opening Report.

VIII.   REBUTTAL OPINIONS REGARDING COPYRIGHTABILITY

28.   I disagree with Prof. Almeroth on a number of the opinions offered in his opening

report regarding the purported creativity and originality of the asserted Cisco CLI features,

including commands, command hierarchies, modes, prompts, and responses, and I respond to

those assertions below.

A.   *I disagree with Cisco's and Prof. Almeroth's use of the phrase "command expression," as it misuses the term "expression" in a way that is inconsistent with its well-known meaning in the field of computer science.*

29.   Throughout Prof. Almeroth's Rebuttal Report, he uses the phrase "command

expressions" to describe the list of CLI command keywords (which, as I discussed in my

Opening Report, are not necessarily complete and syntactically valid CLI commands) shown in

Exhibit 1 to Cisco's Second Amended Complaint, Exhibit F to Cisco's Interrogatory responses,

and Exhibit Copying-2 to the Almeroth Opening Report. Prof. Almeroth uses the phrase

"command expressions" as if it were a well-known, widely-used, and accepted phrase in the

networking industry to refer to CLI commands and command fragments. If that is Prof.

Almeroth's intention, I disagree that the phrase "command expressions" is a well-known,

widely-used, and accepted phrase in the networking industry to refer to CLI commands and

command fragments. Rather, it appears that Prof. Almeroth is using the phrase "command

expression" to bolster his argument that the asserted CLI commands and command fragments are

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"expressive" under copyright law. As explained in detail in my Opening Report, I strongly

disagree with that opinion as well.

30.   I note that Prof. Almeroth does not cite (and I am not aware of) any Cisco or

Arista documentation, or third party documentation that uses the term "command expression" in

the way that Prof. Almeroth and Cisco are using that term (*i.e.*, to refer to CLI commands or

families of CLI commands). I have also not seen any Cisco "Parser Police" emails or documents

that use the term "command expression" to refer to CLI commands or families of CLI

commands. Indeed, the Cisco Parser Police manifesto does not use the term "command

expression" anywhere. *See, e.g.*, CSI-CLI-04824213 (Parser Police Manifesto, Version 6); CSI-

CLI-00754391 (Parser Police Manifesto, Jan. 1999 Version).

31.   Some Cisco and Arista documents use the term "regular expression" in the

context of CLI command syntax, but that term is not used in the same way that Prof. Almeroth

and Cisco use the term "command expression." *See* CSI-CLI-06302874 (Arista EOS User

Manual, Version 4.15.3F). The term "regular expression" (unlike "command expression") is a

well-known term in the computer science and programming field, and would be well-known to

most networking engineers that use the CLI for enterprise-level switches and routers. A "regular

expression" is, generally speaking, a pattern used to match character combinations in strings (*i.e.*,

they are used to define a search pattern). *See id* at Section 3.2.6 ("Regular Expressions").

32.   A non-exhaustive list of examples of "regular expressions" as documented in the

Arista EOS User Manual (which again are very different from what Prof. Almeroth and Cisco

are calling "command expressions") is shown below. This syntax is fairly standard across most

tools, programming languages and operating systems, including grep, vi, emacs, python, etc.

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3.2.6   Regular Expressions

A regular expression is pattern of symbols, letters, and numbers that represent an input string for matching an input string entered as a CLI parameter. The switch uses regular expression pattern matching in several BGP commands.

Regular expressions use the following operands:

> **. (period)**   matches any single character.
>
> > *Example*   **1.3** matches 123, 133, and 1c3.
>
> **\ (backslash)**   matches character or special character following the backslash.
>
> > *Example*   **15\.5\..** matches 15.5.10.10   it does not match 15.52.10.10
> > *Example*   **\.** matches . (period)
>
> **^ (caret)**   matches the character or null string at the beginning of a string.
>
> > *Example*   **^read** matches reader   **^read** does not match bread.
>
> *** (asterisk)**   matches zero or more sequences of characters preceding the asterisk.
>
> > *Example*   **12*** matches 167, 1267, or 12267   it does not match 267

CSI-CLI-06302874 (Arista EOS User Manual, Version 4.15.3F).

33.   In Computer Science, an "expression" is usually a string that requires some computation in order to fully evaluate it. For example, a "(5 + 15) * 4" is often called an "arithmetic expression."[10] A regular expression describing all strings having an "a" followed by zero or more "b"s would be "ab*".   But this expression is a "formula" that describes how to generate a concrete value and some thinking (or computation) is usually required to evaluate that formula. I therefore think it is reasonable to call the expression below (which is not in dispute in this lawsuit) a "command expression:"

clear host [view *view-name*| **vrf** *vrf-name*| **all] {***hostname*| ***}**

34.   The above command expression represents a large number of actual commands. For example, "clear host *hostname*", "clear host view *view-name hostname*"[11], "clear host vrf *vrf-name hostname*", "clear host all *hostname*", "clear host ***", "clear host view *view-name **",

---

[10] The * mark means multiplication and the parentheses mean we add first, so the expression given here evaluates to 80.

[11] Here *view-name* and *hostname* are user-supplied parameters. We follow the Cisco convention of using italics to denote user-supplied values as opposed to keywords.

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"clear host vrf *vrf-name* *", and "clear host all *". These 8 valid commands are embodied by the one "command expression" given above. Note that "clear host" *alone* is not a valid command.

36.   It would be convenient to have a name for the set of 8 commands I just enumerated above. Informally, we may sometimes hear people talk about or refer to the "clear host command" even though "clear host" itself is not a syntactically valid and complete CLI command. They mean, of course, "the family of commands that begin with 'clear host'".

36.   Many of the CLI "command expressions" asserted and accused by Cisco, including those listed in Exhibit Copying-2 to the Almeroth Opening Report, are not command expressions in the sense just described above. They are distillations, shortened forms, (in some cases) prefixes, and not issuable under any configuration of any Cisco product. I therefore believe that it is improper for anyone, including Cisco and Prof. Almeroth, to call them "command expressions."

37.   It is tempting to consider using the term "command prefix" but this fails to capture every case. For example, Cisco accuses the CLI command "username *user-id* [sshkey {*key* | file *filename*}]" by calling it "username sshkey" in Exhibit 1 to Cisco's Second Amended Complaint, and in the various versions of Exhibit F to Cisco's interrogatory responses. Prof. Almeroth also refers to this command as "username sshkey" in his Exhibit Copying-2 to the Almeroth Opening Report. "username sshkey" is not a prefix of any command generated by the regular expression shown. Therefore, referring to Cisco's abbreviated form as a "command prefix" would be inappropriate.

38.   A more appropriate term to describe the asserted and accused CLI command keywords, which I use in this Rebuttal Report, is "command abstraction." While the term "command abstraction" is not a term of art in computer science nor is it commonly used in the

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networking industry, it captures the idea of a shortened representation of a family of commands

that share a set of keywords. It also captures the fact that the selected words from the commands

that Cisco asserts are not, to my knowledge, literally expressed in the source code, but instead

reflect some portion of what a *user* enters to manage or gain access to features on a switch.

Therefore, I will refer to "show" as a command abstraction: it is invalid as a CLI command on its

own, but there are hundreds of Cisco CLI commands that have "show" as a primary command

keyword. I would consider the "show" command abstraction to encompass all CLI commands

beginning with "show" as well as commands that begin with "no show", but I would not include

a command like "ipv6 dhcp-relay show bindings" as being part of the "show" command

abstraction because in this last command "show" is relegated to secondary status under the "ipv6

dhcp-relay" command abstraction.

39.   Note that command abstractions are not pairwise disjoint: I may speak of the

"show" command abstraction and the "show ip" command abstraction, understanding that the

latter is a subset of the former.

40.   As a final point, in Prof. Almeroth's list of 508 asserted and accused command

abstractions (Exhibit Copying-2 to the Almeroth Opening Report), he annotates identical

command abstractions with parenthetical qualifiers to distinguish them based on their context or

function. For example, he lists "area default-cost (OSPFv2)" and "area default-cost (OSPFv3)"

separately. Prof. Almeroth understands that these parenthetical elements are not actually entered

into the Arista CLI (*Id.*, p. 4, footnote 2), but yet considers them distinct command abstractions

for the purposes of his analysis. He gives no indication why this should be true, nor does he

provide further guidance as to how Cisco delineates between its various "command expressions",

nor does he even define what a "command expression" is. As noted in this Report, Prof.

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Almeroth's list of command abstractions are a collection of keyword-subsets, sometimes mixed

with parenthetical qualifiers, sometimes taken from a variety of modes and disparate IOS

variants, without any reference back to any of Cisco's copyrighted works.

> ### B. Prof. Almeroth has failed to identify where in Cisco's registered works the asserted CLI features are literally "expressed" in a tangible medium, and I have seen no evidence that they appear literally in any source code.

41.   As noted in my Opening Report, Cisco's Second Amended Complaint attaches

twenty-six copyright registrations as Exhibits, starting with Exhibit 3 ("Cisco IOS 11.0") and

ending with Exhibit 28 ("Cisco NX-OS 6.2"). Most of those registrations describe the nature of

the work as "new and revised computer code and accompanying documentation" that is based on

or incorporates "[p]rior works by claimant and preexisting third party computer code." *See* Exh.

3 to Cisco's Second Amended Complaint ("Cisco IOS 11.0"); *see also* Exhs. 5 to 28 to Cisco's

Second Amended Complaint. One of the copyright registrations only refers to "new and revised

computer code" and does not refer to user documentation. *See, e.g.*, Exh. 4A (Cisco IOS 11.1).

42.   Based on my review of Cisco's discovery responses in this lawsuit and the

deposition testimony of Cisco witnesses, I understand that Cisco has never identified where any

of the asserted CLI features, such as command abstractions, command hierarchies, command

modes, prompts, and responses, are found within Cisco's source code, whether they are literally

present anywhere in Cisco's source code or are non-literal abstractions from the code.[12] Instead,

Cisco's discovery responses only generally identify the "copyrighted work(s) in which [the

accused CLI feature] appears" for the disputed command abstractions, hierarchies, modes, and

prompts. *See* Exhs. B and F to Cisco's Responses to Arista's First Set of Interrogatories (listing

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[12] I address Cisco's new allegations regarding the "Help" descriptions in a separate section of this Report. For those allegations, Cisco provides a few citations to both Cisco and Arista source code files, but as I explain in this Report, those citations are both extraneous and misleading, and do not support any inference of source code copying by Arista engineers.

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each disputed command abstraction but failing to show where each literally appears within each asserted copyrighted work); Exh. C to Cisco's Responses to Arista's First Set of Interrogatories (listing each disputed command mode and prompt but failing to show where each literally appears within each asserted copyrighted work); Exhs. D1 to D26 to Cisco's Responses to Arista's First Set of Interrogatories (listing various "exemplary" command hierarchies in different versions of Cisco IOS but failing to show where each literally appears within each asserted copyrighted work).

43.   Indeed, neither Exhibit 1 to Cisco's Second Amended Complaint nor Exhibit F to Cisco's Interrogatory responses provides any hint as to specifically where, in any Cisco work registered with the Copyright Office, any the asserted command abstractions can be found. Cisco has not shown any evidence whatsoever that those lists of command abstractions, or any of the individual command abstractions within those lists, are fixed or literally present in any of the asserted registered works at issue in this lawsuit, and where anyone might find them within the works registered and lodged with the copyright office.

44.   For the rest of Cisco's copyright allegations, except for their new "Help" text allegations that I address later in this Rebuttal Report, Cisco points only to portions of its user documentation as "proof" of where the allegedly protected expressions are fixed in the asserted works, and not to any Cisco source code. *See, e.g.*, Exh. A to Cisco's Responses to Arista's First Set of Interrogatories (citing to Cisco user documentation only for its allegations regarding Arista User Manuals); Exh. E to Cisco's Responses to Arista's First Set of Interrogatories (relying on user documentation, and not source code, to show Cisco CLI command outputs).

45.   Prof. Almeroth does not provide any additional clarity or information on these points. The Almeroth Opening Report does not provide any information or opinions regarding

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where any of the accused command abstractions, hierarchies, modes, and prompts can be literally found within any of the registered works. For example, Prof. Almeroth's "Exhibit Copying-2" copies the same information that Cisco provided in its Exhibit B to Cisco's Responses to Arista's First Set of Interrogatories without providing any information about where each "Cisco CLI Command Expression" is literally found within any of the "Copyrighted Work(s) in Which Cisco's CLI Command Expression Appears." *See also* Almeroth Opening Report ¶¶ 168-176 (discussing the disputed Cisco command abstractions, vaguely asserting that "Arista copied over 500 specific multi-word command expressions that are elements of the Cisco IOS copyrighted works," but failing to identify where any of the disputed command abstractions literally appear in any Cisco copyrighted work).

46.   Prof. Almeroth similarly fails to identify where each disputed command mode and prompt appears literally within any of the "Copyrighted Work(s) in Which Cisco's Command Mode and Prompt Appears." *See* Exhibit Copying-4 to the Almeroth Opening Report; *see also* Almeroth Opening Report ¶¶ 177-185 (discussing the disputed Cisco command modes and prompts and failing to identify where they literally appear in Cisco's copyrighted work).

47.   Regarding the allegedly copyrighted and copied "hierarchies," Prof. Almeroth merely identifies in his Opening Report eleven allegedly copied command "hierarchies" (specifically, "aaa", "bgp," "clear," "dot1x," "ip," "ipv6," "neighbor," "show," "snmp-server," "spanning-tree," and "vrrp") and, for each of the eleven, lists out the disputed command abstractions that start with those keywords in his "Exhibit Copying-5" to the Almeroth Opening Report[13]. *See* Almeroth Opening Report ¶ 186 ("I understand that Cisco contends that Arista copied the following command hierarchies as well:" and then listing these same eleven command

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[13] Interestingly, Prof. Almeroth does not include the asserted command abstraction "no snmp-server" in the "snmp-server" hierarchy.

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hierarchies in bullet point form). Prof. Almeroth does not identify specifically where, in any

registered work, any of these command hierarchies are fixed or literally appear, and indeed does

not provide that information for any of the command abstractions that comprise any of the eleven

hierarchies. *Id.* ¶¶ 186-193; *id.* at Exhibit Copying-5.

48.   Moreover, based upon a review of the command abstractions listed in Exhibit

Copying-5 to the Almeroth Opening Report, it is apparent that each of the eleven hierarchies

consist of command abstractions found in ***different*** Cisco operating systems. For example, the

"aaa accounting" and "aaa accounting dot1x" command abstractions within the "aaa" hierarchy,

based on Exhibit Copying-5, are not in the same Cisco operating systems. Similarly, the

command abstraction "bgp listen limit" is not in NX-OS, per Exhibit Copying-5, while other

command abstractions in the "bgp" hierarchy are. In the "clear" hierarchy, the "clear ip arp" and

"clear spanning-tree counters" command abstractions are found only in NX-OS, while the "clear

arp-cache" and "clear lldp table" command abstractions are not in NX-OS at all. *See, e.g.*

Exhibit Copying-5 to the Almeroth Opening Report. Similarly, the "ip igmp snooping vlan

static" command abstraction does not appear in NX-OS, while the "ip igmp startup-query-

interval" command abstraction is only in NX-OS. *Id.* These are not the only examples. Other

instances of command abstractions within a hierarchy that are not found within the same

registered work are apparent from the face of Exhibit Copying-5.[14] Therefore, based on Exhibit

Copying-5, the disputed hierarchies cannot be found in any single registered work (literally or

---

[14] A few more examples, which do not cover all inconsistencies, can be seen by comparing the registered works
associated with "ip pim bfd-instance" and "ip pim bsr-border", "ipv6 nd ra suppress" and "ipv6 nd ra lifetime",
"neighbor description" and "neighbor remote-as", "show environment cooling" and "show environment power",
"show hostname" and "show interfaces flowcontrol", "show ipv6 bgp" and "show ip route tag," and "spanning-tree
portfast bpdufilter default" and "spanning-tree bridge assurance." For some of these command abstractions, they do
not appear in any overlapping registered works.

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non-literally), but instead appear to consist of command abstractions spread across multiple

works.

49.   For the thirty-seven disputed command responses (or outputs), Prof. Almeroth's

"Copying Exhibit-3" to his opening report is identical in all respects to Cisco's Exhibit E to its

interrogatory responses, except for the addition of general citations to Arista user manuals (not

source code) under the screenshot of the disputed Arista manual. Prof. Almeroth provides no

evidence of where the asserted command outputs appears in any Cisco registered work beyond

citing to a *single* Cisco user manual for each of the thirty-seven examples shown in his Copying

Exhibit-3. *See* Almeroth Opening Report ¶¶ 194-201. Moreover, Prof. Almeroth's analysis of

the accused command responses was limited to "confirm[ing] that the examples shown in

Exhibit E exist *in Arista's product documentation*" and not source code or the Arista EOS CLI

itself. *Id.* at ¶ 198 (emphasis added).[15]

50.   ███

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[15] I comment on Prof. Almeroth's and Cisco's new allegations regarding "Help" text (*see* Almeroth Opening Report at ¶¶ 202-221, and Exhibit Copying-6) later in this rebuttal report.

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███ .

51.   ██

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██

██

52.   In sum, Cisco allegations that Arista copied the disputed features of the Cisco CLI (*e.g.*, particular command abstractions, hierarchies, modes, prompts, and responses) appear to be directed at ***non-literal*** aspects of the Cisco CLI, and ***non-literal*** aspects of the Arista EOS CLI, although that too is still unclear.

53.   Whether Cisco's allegations are of copying literal or non-literal elements, Prof. Almeroth did not make any effort to compare any one of the Cisco registered works (let alone all) to the accused Arista works for purposes of determining the level of similarity. I understand that in order to conclude that there has been infringement, one must undertake a comparison of the works to determine whether, as a whole, they are sufficiently similar to support a finding of illicit copying. In this case, Prof. Almeroth could have compared the source code of any of the Cisco works to Arista's code, for example. But he has not and has not proposed any other method for comparing the works as a whole. Should he be permitted to expand his opinions to include a comparison that is not set forth in his opening report, I reserve the right to respond. I note preliminarily that many of the observations in my opening report about the differences between the various Cisco operating systems on the one hand and Arista's EOS on the other, as

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well as the *de minimis* portion of Cisco's operating system occupied by the asserted CLI elements, are among the relevant facts I incorporate here as indicating the lack of overall similarity between the Cisco asserted works and Arista's EOS.

54.   I understand that Cisco's failure to identify specifically where, and in what asserted work(s), each asserted CLI element is fixed or located is relevant to both the ownership and validity under copyright law of the asserted CLI elements, as well as to other issues regarding Cisco's copyright infringement claims (specifically, what aspects of Cisco's asserted works should be compared to what aspects of the accused Arista works, and the scope of protection and requisite similarity that applies to the infringement inquiry).

C.   ***Prof. Almeroth's failure to identify where and when the asserted CLI features were published and registered calls into doubt whether such features are original to Cisco, and whether a presumption of validity and ownership applies.***

55.

56.   Moreover, I also understand that Cisco's failure to register for copyright protection within five years of first publication may bar Cisco from any legal presumption of validity or ownership over the asserted works. Neither Cisco nor Prof. Almeroth has provided

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any information to Arista regarding when each asserted CLI feature was first published by Cisco, and when each asserted CLI feature was first registered by Cisco for copyright protection. I note, however, that the earliest copyright registration I have seen for Cisco IOS is version 11.0 (*see* Exh. 3 to Cisco's Second Amended Complaint), which was registered with the Copyright Office in June 2002, and that based on the information provided by Cisco in discovery (including in Exhibit F to Cisco's interrogatory responses), it appears that many of the asserted CLI features (including asserted modes, prompts, and command abstractions) were published more than five years before they were first registered with the copyright office. I understand that Cisco's failure to provide this information is the subject of a motion to compel filed by Arista. Should Cisco provide this additional information, I reserve all rights to opine on such information as part of my opinions regarding copyrightability.

> **D.** *Prof. Almeroth's functional descriptions of the CLI, including the asserted CLI command modes, prompts, and hierarchies, confirm that they are systems and methods of operation, which I understand are not protected by copyright.*

57. Throughout his opening report, Prof. Almeroth describes the disputed Cisco and Arista CLIs, including the asserted and accused aspects of the CLI, in a functional manner, making it clear that the asserted CLI features are the means by which users control and operate the underlying routers and switches. Those descriptions by Prof. Almeroth directly support my opinion, explained in my Opening Report (*see* Opening Report ¶¶ 254-266), that the elements of the Cisco CLI it accuses Arista of copying are part of a method of operation and/or a system, neither of which is protected by copyright law, according to my understanding.

58. A CLI is a "Command Line Interface."[16] An "interface" comprises the entire set of functions that work together to deliver the interface to the user. The interface provides a

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[16] Less often this acronym is instead taken to mean "Command Line Interpreter".

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prompt, echoes keystrokes as they are typed, parses the string typed, responds to editing

commands, accepts abbreviated keywords, provides TAB expansion, supports the "?" feature,

accepts a core set of CLI commands, and outputs results back to the user. Notice that everything

on this list is a *functional* chore. The only thing *expressive* about the CLI is the source code that

implements it. The CLI is a system, not a literal work. Prof. Almeroth, in his expert report,

agrees with this system-based characterization of a CLI: "A CLI computer program allows a user

to enter a 'command' into a text-based input *system* [...]." Almeroth Opening Report ¶ 50

(emphasis added). Since I understand that copyright protection does not extend to any "idea,

procedure, process, system, method of operation, concept, principle, or discovery," Prof.

Almeroth's own description of a CLI supports my opinion that the elements of the Cisco CLI it

accuses Arista of copying are not protected by copyright.

59.   Prof. Almeroth's description of command hierarchies also underscores the fact

that CLI hierarchies are merely a common method of operation for users to interact with a

networking device using a command-line interface. As stated in the Almeroth Opening Report:

"Cisco's command expressions are *organized* hierarchically into groups and subgroups of

command expressions (as opposed to, for instance, having no organizational structure)."

Almeroth Opening Report ¶ 54 (emphasis added). "Through this particular design, ... a specific

set of second words or tokens would follow the initial token, and then a further set, etc." *Id.* at ¶

114. "The hierarchy conveys to a user ... the set of choices, i.e., what is possible and what is not.

In some cases ... , the hierarchy helps to *organize* choices into parallel possibilities." *Id*

(emphasis added)*.* This description of the command hierarchy, where the CLI processes a multi-

word command on a token-by-token (*i.e.*, keyword by keyword) basis, describes the method of

how a user enters CLI commands not just in the Cisco CLI, but in the multi-word legacy CLIs

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sold by DEC before Cisco even existed, and in almost all CLIs used by switches and routers today. *See* Opening Report at ¶¶ 105-106 (discussing the use of command hierarchies by CLIs), ¶¶ 178-430 (analyzing the wide use of hierarchy-based industry-standard CLIs by Cisco competitors since the mid-1990s), ¶¶ 545-571 (analyzing pre-Cisco DEC products that used hierarchical multi-word CLIs).

60.   Prof. Almeroth's description of the disputed command hierarchies in this functional way is not at all surprising. There is no way to accurately describe command hierarchies other than as an organizational system. Likewise, a network engineer would only describe the asserted command abstractions by what they do and how they are invoked by end-users of a router or switch CLI who wish to configure or control the device. Contrary to Prof. Almeroth's assertions, there is nothing "aesthetic" about how this method of operating a router or switch via the CLI worked for users of DEC equipment in the late 1970s and early 1980s, and how it works for end-users of Dell, Juniper, HP, D-Link, Brocade, Extreme, and other manufacturers of switches and routers today.[17]

61.   The description of command modes and prompts in the Almeroth Opening Report is similarly tied to a method of operating and configuring routers and switches using the CLI. As Prof. Almeroth explains, command modes are "used to navigate the CLI and perform basic device startup, configuration and monitoring tasks" where "each mode supports a specific set of commands" and "[e]ach mode also has an associated visual 'prompt' that helps the user identify which mode they are in and, therefore, which commands are available." Almeroth Opening

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[17] Prof. Almeroth tries to add elements of creativity to the operation of command hierarchies by adding words like "creative" and "aesthetic" when describing the hierarchical method of operation. *See, e.g.*, Almeroth Opening Report ¶¶ 114, 117 ("The hierarchy conveys to the user an aesthetic sense of the set of choices, *i.e.*, what is possible and what is not."); ¶ 188 ("The hierarchies are creative constructs …"). But Prof. Almeroth does not explain what is "aesthetic" about a hierarchical organization of commands. More important, he does not provide any explanation as why such an organization is not an unprotectable "system" or "method of operation."

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Report ¶ 58. The fact that the disputed command modes are a method of navigating the CLI, and separating different sets of commands among different modes for performing basic startup, configuration, and monitoring tasks on the switch or router, is precisely why they are not subject to copyright protection, as explained in my Opening Report. And the purely functional purpose of the associated command prompts—to ensure that the user knows what particular command mode he or she is currently operating *and nothing more*—is part of the method of operating the disputed devices via their respective CLIs.

62.   I also note in this discussion Prof. Almeroth concludes that the asserted CLI elements came about "through a creative process since professional judgment and subjective decisions by Cisco's engineers were required to create them." Almeroth Opening Report ¶ 58. Putting aside the question of whether Cisco engineers exercised judgment as opposed to choosing among pre-existing CLI features and characteristics with which they were familiar, Prof. Almeroth provides no opinion, or even a test for determining, whether the judgment exercised was one of engineers seeking to design the most functionally sound system, as opposed to engineers creatively expressing themselves. I have seen nothing suggesting that the decisions Cisco engineers made arriving at CLI commands, modes, prompts, or responses, or organizing commands into a hierarchy are anything but for decisions driven by a desire to use industry-familiar terminology, organized logically according to initial keyword, and implemented according to common modes of operation to facilitate functionality.

63.   These descriptions by Prof. Almeroth of the asserted and accused CLI elements, and the functional role they play in the operation and management of Cisco and Arista switches, supports not only my opinions regarding the lack of copyright protection over those elements, but also supports my opinions regarding Arista's defenses to Cisco's copyright assertions. In

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particular, Prof. Almeroth's functional description of the CLI and the asserted aspects thereof shows that at most, only "thin" copyright protection could possibly apply to these aspects of the CLI. In addition, the fact that many legacy and current CLIs support the same functionality is further evidence that the *scenes a faire* doctrine should apply to Cisco's CLI assertions, as these features are stock, common, and necessarily follow from implementing a CLI on a switch or router.

> ### E. I disagree with Prof. Almeroth's opinion that Cisco's use of "show" commands, and other commands and CLI features used in legacy systems in the late 1970s and early 1980s, is original and creative.

64.   Prof. Almeroth opines that the choice of various command words requires creative thought (Almeroth Opening Report ¶ 101) and then cites Mr. Lougheed's deposition testimony as support, including citations to various "show" commands, among others (*see, e.g.*, Almeroth Opening Report ¶¶ 102-104). I note that Prof. Almeroth reaches a conclusion about the creativity and originality of the asserted CLI elements without conducting any independent evaluation of evidence suggesting that the CLI "authors" may have been following pre-existing naming practices and network standards. Prof. Almeroth does not appear to perform any independent assessment of originality, but rather just quotes from Cisco's own witnesses. In my opinion, such an analysis does not meet even the most basic requirements of scientific investigation. I disagree with Prof. Almeroth's opinions regarding the creativity behind the Cisco's use of many of the asserted CLI elements disputed in this lawsuit, including the disputed "show" commands.

65.   As discussed extensively in my Opening Report (*see, e.g.*, Opening Report at ¶¶ 559-567), "show" as the first word of a CLI command was already well-established in CLIs that predate Cisco's founding. In fact, in my Opening Report, I provide examples of legacy systems

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created and sold by Digital Equipment Corporation (DEC), including TOPS-20, VAX/VMS,

DECnet-RSX, and the DECNet DIGITAL Network Architecture, that used hierarchical and

structured multi-word CLI commands (including "show" and "clear" CLI commands), and cite

to evidence showing the clear ties between the Cisco CLI and those prior legacy systems. *See,*

e.g., Opening Report at ¶¶ 545, 558-572, 576-579, 633.

66.   I also addressed in my Opening Report Kirk Lougheed's admitted hands-on

experience with DEC products, as well as other pre-Cisco systems (including the Quasar print

controlling program at Stanford, the SUMEX software authored by Mr. William Yeager at

Stanford, and the Stanford EECF Ethertip/Gateway software), that he worked directly with

before he did any work for Cisco, and how those pre-Cisco products featured structured multi-

word CLI commands, "show" command hierarchies, and even some of the same command

modes (privileged and nonprivileged) and prompts (">" and "#") that are disputed here. *See,*

e.g., Opening Report at ¶¶ 574-582, 636. Prof. Almeroth ignores all of this evidence about

Cisco's copying of legacy CLI features in the Almeroth Opening Report[18].

67.   Indeed, Prof. Almeroth ignores the fact that the earliest use of "show" commands

dates back to at least the late 1970's in a real-time operating system called RSX-11. RSX-11 ran

on PDP computers manufactured and sold by DEC, and initially used a CLI called "Monitor

Console Routine" or "MCR".[19] The prompt looked like this: "mcr>".[20] The MCR was replaced

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[18] Indeed, Prof. Almeroth states explicitly, "I have not seen any evidence that the multi-word command expressions (along with their specific associated modes and prompts) asserted in this case—or any of the other elements at issue in this case from the copyrighted works—originated from anywhere other than Cisco" (Almeroth Opening Report ¶ 260) in spite of his being aware of Mr. Lougheed's familiarity with TOPS-20 and the Stanford SUMEX software (*Id.*, ¶ 259).

[19] I already discussed DECnet-RSX as a legacy system in my Opening Report. *See* Opening Report ¶ 567. RSX-11 is part of DECnet-RSX, as explained in the DECnet-RSX manual cited in my Opening Report. *See also, e.g.*, "RSX-11M System Logic Manual, Order No. AA-5579A-TC, Vol. 1, RSX-11M V3.1" (Nov. 1978), *available at* http://bitsavers.trailing-edge.com/pdf/dec/pdp11/rsx11/RSX11M_V3.1_Dec77/RSX11M_V3.1_SysLogicManVol1_Nov78.pdf (herein "Nov. 1978 RSX-11M Manual").

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by a more powerful CLI called "Digital Command Language" or "DCL". For RSX-11M V4.1

and later, DCL was the same as the DCL on VAX/VMS V3.[21] By this date, DCL already

supported several "show" commands:

```
CHAPTER 2          THE SET AND SHOW COMMANDS

    2.1     SET AND SHOW TIME  . . . . . . . . . . . . . . . 2-1
    2.2     SHOW MEMORY  . . . . . . . . . . . . . . . . . . 2-2
    2.3     SET AND SHOW TERMINAL  . . . . . . . . . . . . . 2-2
    2.4     SHOW DEVICES . . . . . . . . . . . . . . . . . . 2-3
    2.5     SHOW QUEUE . . . . . . . . . . . . . . . . . . . 2-3
    2.5.1     SHOW PROCESSOR . . . . . . . . . . . . . . . . 2-4
    2.6     SHOW ASSIGNMENTS . . . . . . . . . . . . . . . . 2-4
    2.7     SET AND SHOW DEFAULTS  . . . . . . . . . . . . . 2-4
    2.8     SHOW TASKS . . . . . . . . . . . . . . . . . . . 2-5
    2.9     SHOW USERS . . . . . . . . . . . . . . . . . . . 2-5
    2.10    SET PROTECTION . . . . . . . . . . . . . . . . . 2-6
    2.11    SET AND SHOW SYSTEM/DIRECTORY AND
            LIBRARY/DIRECTORY  . . . . . . . . . . . . . . . 2-6
    2.12    SET DEBUG  . . . . . . . . . . . . . . . . . . . 2-7
```

See Apr. 1983 RSX-11M Manual (full citation in footnote 18). Note that this manual was first

published in 1979, many years before Kirk Lougheed began writing routing software at Stanford,

and was used on PDP-11s and VAXes. Mr. Lougheed was a systems programmer on a DEC

platform[22] when he first implemented "show" commands for his EECF software. In fact, Cisco's

CLI supports "show memory", "show terminal", "show queue"[23], and "show users". Four out of

the 11 "show" commands from DCL were inducted into the Cisco CLI with essentially the same

semantics. Prof. Almeroth does not attempt to explain this coincidence, which strongly suggests

that Mr. Lougheed borrowed commands and the show "hierarchy" from these legacy systems,

and did not come up with them originally.

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[20] This looks just like a Cisco EXEC prompt: if your hostname is "mcr" on a modern Cisco device, you will get the same exact prompt.

[21] "RSX-11M/M-PLUS Command Language Manual, Order No. AA-L672B-TC" (Apr. 1983) §1.6.1, *available at* http://www.textfiles.com/bitsavers/pdf/dec/pdp11/rsx11/RSX11M_V4.1_Apr83/2_Operation/AA-L672B-TC_dcl_Apr83.pdf (herein "Apr. 1983 RSX-11M Manual").

[22] *See, e.g.* Lougheed Dep. Tr. at 29:23-33:9, 37:9-36:22, 43:9-11, 49:18-51:22, 215:14-216:4, 217:7-218:2.

[23] I note that "show queue" is a complete command in DCL; it is only a command *prefix* in IOS, as it requires more keywords to be a complete IOS command

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68.   In my opinion, Mr. Lougheed did nothing wrong in lifting these commands (either consciously or unconsciously) from DCL because in my view, CLI commands are *not expressive* and therefore not eligible for copyright protection. However, I note Prof. Almeroth did nothing to substantiate his improbable claim that Mr. Lougheed was creative when putting "show" at the front of a CLI command. This had been done years before on DEC systems and other systems, including the Quasar print controlling program at Stanford, and Mr. Lougheed admitted that he used "show" commands before beginning work for Cisco. *See, e.g.*, Lougheed Dep. Tr. at 259:18-260:23 (confirming that as early as 1981, the Quasar print controlling program at Stanford had a user interface called OPR, and OPR used a CLI that supported several "show" commands); Exh. 459 to Lougheed Dep. (KL-00001699); Opening Report ¶ 574. I do not see any creativity involved in Cisco's mimicking the standard CLI practices of the day.

69.   My opinion and disagreement with Prof. Almeroth is the same with respect to the other CLI commands (or command fragments and hierarchies) that were already supported by prior operating systems and products before Cisco's routing software was created, including commands and command fragments supported by TOPS-20, VAX/VMS, RSX-11 and DECnet-RSX, and the EECF and SUMEX software developed at Stanford. *See, e.g.*, Opening Report ¶¶ 105-107, 498-516, 547-582, 632-635. I do not see any creativity involved in Cisco's mimicking those already existing commands, command fragments, and command hierarchies that were already being used in prior systems.

70.   My opinion and disagreement with Prof. Almeroth is also the same with respect to the command modes and prompts that were already in use in the SUMEX software written by William Yeager at Stanford, and supported by the EECF Ethertip software at Stanford, as well as in DEC TOPS-20 and UNIX, before Mr. Lougheed purportedly added them to Cisco's routing

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software. *See, e.g.*, Opening Report ¶¶ 498-516, 559, 578-580, 636. I do not see any creativity

involved in Cisco's mimicking those already existing command modes and prompts.

71.   Prof. Almeroth claims that Mr. Lougheed's choices regarding how to name the

asserted modes was also creative. He states that "Cisco's designers could have used different

names for the asserted modes; for example, they could have chosen 'ADMIN' instead of 'EXEC'

or 'Secure ADMIN' instead of 'Privileged EXEC.'" Almeroth Opening Report ¶ 116. I certainly

agree that these alternate names could have been chosen by Mr. Lougheed when the initial Cisco

CLI was devised. However, Mr. Lougheed testified that he was employed as a DECSYSTEM-

20 systems programmer at Stanford, and that he used TOPS-20 as part of his employment. And

Mr. Lougheed was familiar with the program that provided the CLI for TOPS-20; that program

was called "EXEC" (Lougheed Dep. Tr. at 50:19-51:1) Mr. Lougheed was also familiar with the

"privileged" mode of TOPS-20 that was accessed via the CLI command "enable." (*Id.*, at 55:10-

56:15) Therefore, when Mr. Lougheed selected "EXEC" for Cisco's non-privileged mode and

"Privileged EXEC" for its privileged mode, he was using the same two CLI modes he was

already familiar with from TOPS-20. Prof. Almeroth suggests that some measure of creativity

was involved in this choice, but I disagree: a choice to forgo inventing new terms in favor of

using the well-established ones you already know can hardly be deemed "creative."

> **F.   I disagree with Prof. Almeroth's opinion that "Cisco engineers faced endless aesthetic choices for each of the numerous commands now found in the Cisco IOS CLI computer program" and could choose random words for commands.**

72.   I also strongly disagree with Prof. Almeroth's blanket statement that "Cisco

engineers faced endless aesthetic choices for each of the numerous commands now found in the

Cisco IOS CLI computer program." Almeroth Opening Report ¶ 51. And although Prof.

Almeroth is technically correct that "any one of the asserted command expressions could, in

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theory, be any random set of words of characters, and yet the command would still work," (*id.* at

¶ 101) from both my experience and the relevant evidence from Cisco it is clear that Cisco never

believed it could (or should) require its customer to use CLI commands that were unrelated to the

functionality they implemented.

73.   As explained in my Opening Report and in the prior section of this rebuttal report,

many of the asserted command abstractions (as well as asserted command modes, prompts, and

hierarchies) replicated the same CLI features supported in legacy CLIs that pre-dated Cisco. *See,*

e.g., Opening Report ¶¶ 547-582. Moreover, Cisco's early engineers like Mr. Lougheed were

familiar with (if not experts on, based on job descriptions and statements in job applications)

those prior systems, like TOPS-20, UNIX, and the Stanford SUMEX and EECF programs. *See,*

e.g. Lougheed Dep. Tr. at 212:15-218:2. There was no creativity, and no aesthetic choice,

behind Cisco's adoption of those existing legacy CLI features.

74.   Cisco's copying also extended to reusing CLI command syntaxes and conventions

that already existed in the Cisco software. *See* Opening Report ¶ 597 (citing to and discussing

the testimony of Cisco engineer Abhay Roy, who admitted reusing the "ip" command syntax for

"ipv6" commands because Cisco engineers "don't reinvent the wheel" and "[i]f there is

something which is done, go with it."), ¶¶ 619-628 (analyzing documents and deposition

testimony showing how Cisco engineers would reuse old commands, and old command

hierarchies, when adding new commands for the specific purpose of ensuring consistency within

the CLI); *see also id.* at ¶ 625 (quoting from Mr. Lougheed's deposition where he acknowledged

being "constrained" by the existence of an "ip" hierarchy when adding new CLI commands); *id.*

at ¶ 626 (quoting from Mr. Patil's deposition where he acknowledged simply reusing "clear" and

"show" commands because they were already being used in Cisco's CLI). There was no

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creativity, and no aesthetic choice, when Cisco engineers copied from and reused old, pre-existing command syntaxes.[24]

75.   Finally, as discussed in detail in my Opening Report, many Cisco engineers admitted to reviewing and studying industry standard documents from the IEEE and IETF prior to adding new CLI commands to Cisco IOS (particularly when adding functionality defined or described by an IEEE or IETF publication), and use industry-standard terms directly from those publications in the asserted command abstractions. *See* Opening Report ¶¶ 583-618 (in these paragraphs, I also discuss Cisco's use of accepted industry parlance in CLI commands, which is also unoriginal). The lack of creativity behind this direct copying is readily apparent for asserted commands that use terms and acronyms that are expressly defined by the industry standards for functionality mandated by the standards (*e.g.*, the "priority1" and "priority2" parameters for Precision Time Protocol, or PTP, are clear examples of mandatory parameters that are defined by the PTP IEEE standard; there was no creativity involved when using the word "priority1" for a command that configures the IEEE PTP standard-defined parameter "priority1"). *See id.* at ¶ 589 (discussing these parameters).

76.   These shortcuts taken by Cisco engineers when adding new CLI commands to Cisco's software, such as copying existing CLI commands and re-using terms that are found in industry standards, is not surprising given that the Parser Police Manifesto and the Parser Police at Cisco were created to "[e]nsure consistency, usability, and friendliness of the configuration interface to Cisco IOS." *See* Exh. 438 to Remaker Dep. (Cisco Parser Police Manifesto, Version

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[24] I note again here, as I noted in Paragraph 624 of my Opening Report, that many of the older commands from which Cisco engineers copied are *not* being asserted by Cisco in this litigation. For those commands, Cisco has provided no evidence that they are original or creative.

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6, CSI-CLI-04824213); *see also* Opening Report ¶¶ 602-613 (discussing the Parser Police

Manifesto).

77.   While Prof. Almeroth suggests that the Parser Police's existence is evidence of

the creativity and originality behind the addition of new CLI commands (*see, e.g.*, Almeroth

Opening Report ¶ 107), my opinion is that it shows just the opposite. If a Cisco CLI command

could be "any random set of words of characters" as Prof. Almeroth asserts, there would be no

need to have a Parser Police or a Parser Police Manifesto. The reason the Parser Police and the

Parser Police Manifesto exist is to ensure that new CLI commands do ***not*** use random words like

"whizzy-asic" or "walamazoo" (*see* Parser Police Manifesto, CSI-CLI-00754391, giving these

examples of unacceptable CLI commands), and that new CLI commands are self-explanatory,

and use names and accepted industry acronyms that are familiar to people in the industry. *See*

Parser Police Manifesto, CSI-CLI-00754391; Opening Report ¶ 603.

78.   In sum, Prof. Almeroth completely ignores all of the foregoing evidence showing

that Cisco engineers reused and copied commands, command fragments, command hierarchies,

command modes, and command prompts when adding CLI features to Cisco's software. I have

not ignored that evidence, which I have already discussed in detail in my Opening Report, and

disagree with Prof. Almeroth's opinion that the creation of the asserted CLI features involved

"endless" aesthetic choices.

> **G.   I disagree with Prof. Almeroth's opinion that Cisco was creative when choosing to use a CLI in its products.**

79.   Prof. Almeroth opines that "Cisco's engineers were faced with the fundamental

creative question of what type of computer program to implement. And there were a **broad**

range of options open to them . . . including but not limited to a command line interface (e.g.,

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DOS or UNIX), a graphical user interface, and a menu-driven interface, among others."

Almeroth Opening Report ¶ 232 (emphasis added).

80.   Cisco was founded in 1984. Although the first commercial GUIs were just appearing (notably the Apple Lisa and Apple Macintosh were released in 1983 and 1984, respectively), it would not have been remotely plausible for Cisco's first products to incorporate a GUI as its user interface. GUIs require special graphics hardware, a so-called "bit-mapped display" and a graphics card in order to function. Cisco's routers and switches, to this day, do not have graphics support or an integrated video monitor. Moreover, in 1984 the only communication mode for a network device to communicate with the operator was via a serial link at 9600 baud[25] which is about 1,000 times slower than a typical cable modem Internet user enjoys in 2016. Therefore if the imagined GUI were run on an external computer, the user experience would have been severely hampered by the limited serial line speed. And finally, the cost of providing a GUI in 1984 would have added a very significant price increase to the price of the Cisco products. Prof. Almeroth does not describe the manner in which these technical and economic obstacles could have been overcome in 1984 to produce a functioning router with a graphical user interface. Instead, Prof. Almeroth points to a web-based GUI provided by Avaya. *Id*., p. 125, footnote 175. This is unconvincing: the web did not exist until at least 1991 and the first popular web browser (NCSA Mosaic) was not released until 1993. Therefore a web-based GUI, such as the Avaya interface cited by Prof. Almeroth, was simply impossible in 1984.

81.   Suggesting a "menu-driven" interface as an alternative to the CLI in 1984 is more reasonable: a menu-driven interface can be run over a relatively-slow 9600 baud serial line. However, I would contend that Cisco's IOS CLI *is* essentially a menu-driven interface. As

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[25] This is about 960 characters per second.

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extensively discussed in my Opening Report and this Rebuttal Report, the option exists at any

Cisco CLI prompt to simply type "?" and a *menu* of options appears relative to the current

context. If the operator then chooses one of these options, she or he can then type another "?"

and a *sub-menu* of options for the next word appears. This functionality, offering a list of

options based on context, is exactly what a menu-driven interface does. It is certainly possible to

implement a "full-screen menu-driven interface" using an addressable cursor,[26] however in my

opinion this would have been a poor choice for Cisco: not all terminals would support

addressable cursors, supporting a more complex interface (with possibly different terminal

dimensions) would have added an extra engineering burden, and extending an interface that uses

limited screen real-estate is far more difficult than extending a menu-driven interface that is built

into a CLI.   The only example Prof. Almeroth gives of a menu-driven interface is for a web-

based HP product. *Id.*, p. 127, footnote 178. Once again, the web did not exist until many years

after the appearance of Cisco's first CLI product.

82.   Prof. Almeroth claims there was a "broad range of options" on how to design an

interface for Cisco's first devices, yet he names only two: a GUI (utterly impractical for a

networking device in 1984) and a menu-driven interface (which Cisco essentially implemented,

following the lead of TOPS-20). I am unaware of any other candidates in Prof. Almeroth's

"broad range of options" and he offers no further examples.

83.   The use of a CLI as the primary interface to an operating system was a long-

established practice by 1984. As exemplified in my Opening Report (*See* Opening Report ¶ 93)

all legacy systems by 1984 were based on a CLI; indeed some of these machines used a teletype

(*Id.*, at ¶ 99) as the terminal when no other option was even conceivable. Mr. Lougheed had

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[26] Some "smart" video terminals in 1984 allowed the cursor to be moved to any position on the screen in order to provide persistent menus and an interface allowing selection of menu items using the arrow keys.

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used Unix (Lougheed Dep. Tr. at, 38:29-39:2) and was a systems programmer using TOPS-20

(*Id.*, at 32:15-21 and 30:23-31:1). Both of these systems used a CLI and only a CLI in 1984.

Mr. Lougheed would have been very familiar with the fact that a CLI was the most common and

most widely-used interface for operating a computer when he chose to implement the first CLI

for Cisco. Interacting with an operating system via a full-screen menu-driven interface or

building the complex and elaborate hardware and software to support a GUI would have

constituted dramatic departures from standard practice in 1984. Prof. Almeroth insists that a

measure of creativity was involved in the choice to use a CLI, but I disagree: a choice to forgo

using new technologies in favor of using the predominant technology can hardly be counted as

"creative."

84.   Prof. Almeroth seems to imply that using Arista EOS's underlying Linux

interface could have been used in place of the CLI (Almeroth Opening Report ¶ 237); to support

this view he recites deposition testimony from two Arista employees (Mr. Duda and Mr.

Sadana). However, the recited testimony proves just the opposite of Prof. Almeroth's claim:

both deponents stated that *some* things could be done using Linux ("There were certainly **some**

things that could be done in Linux." *Id.* at Mr. Duda Testimony (emphasis added); "[...] So **those**

types of tools would easily work [...]" *Id.* at Mr. Sadana Testimony (emphasis added). In other

words, there were some things that could be done from Linux but some other things that could

not. Simply pushing config files via Linux tools does not provide an alternative to the industry

standard CLI that most network engineers expect to be present. In particular, pushing config

files does not provide the interactive interface most effective for troubleshooting problems or

checking device statistics. And notably, config files are often specified using CLI commands,

meaning the CLI parser is still being invoked, just via another means. Therefore I strongly

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disagree with Prof. Almeroth's contention that an Arista device could be managed via its Linux interface.

IX.   REBUTTAL OPINIONS REGARDING SCENES A FAIRE AND ARISTA'S DEFENSES TO CISCO'S COPYRIGHT CLAIMS

85.   I also disagree with Prof. Almeroth on a number of the opinions offered in his opening report regarding the external factors that limit the selection of command keywords in the context of Cisco IOS CLI commands, as well as other assertions that relate to Cisco's copyright infringement assertions and Arista's copyright defenses. I address those disagreements below.

86.   I also emphasize that my opinions stated above, and in my Opening Report, regarding the copyrightability of the asserted aspects of Cisco's works, including the reasons why those asserted aspects of Cisco's works are functional and not expressive (*e.g.*, are methods of operation and/or systems, which I understand are not protected by copyright), are not original to Cisco, and did not involve any creativity when added to the asserted works, also apply to and are offered in support of Arista's defenses to Cisco's copyright infringement assertions, including Arista's defenses under the *scenes a faire* doctrine, words and short phrases doctrine, merger doctrine, fair use defense, and copyright misuse doctrine.

87.   For example, I understand that Cisco's attempts to use copyright to restrict others, including Arista, from using functional aspects of the CLI, including methods of operation and systems that are not protected by copyright law, may be copyright misuse. Therefore, my opinions in response to Prof. Almeroth's opening report on why the asserted aspects of the CLI are methods of operation and therefore not copyrightable apply equally to Arista's copyright misuse defense to the extent that Cisco is attempting to restrict Arista and others from using those methods of operation, and other CLI functionality.

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88.   My opinions regarding the functional nature of the CLI and the asserted and

accused aspects of the Cisco and Arista CLIs are also highly relevant to Arista's fair use defense,

including the fair-use factors that look at the "purpose and character of use" and the "nature of

the copyrighted work," and are further relevant to the parties' dispute regarding the scope of any

copyright protection that extends to the asserted aspects of Cisco's CLI (*i.e.*, whether such

copyright protection, if any exists at all, is "thin" as opposed to "broad," and what if any

protectable expression remains after filtering out asserted elements of Cisco's CLI that are *not*

protectable by copyright).

89.   My opinions regarding Cisco's copying of features from legacy systems,

including CLIs supported by Digital Equipment Corporation products in the 1970s and early

1980s and other computer systems that predate the asserted works, are also relevant to Arista's

copyright defenses, including *scenes a faire*, words and short phrases, and fair use defenses.

Even if Cisco contends that it did not copy the asserted CLI features (or aspects thereof) directly

from legacy systems that predate the asserted works, the fact that those existing systems already

supported those CLI features is highly suggestive that external factors severely limited the

practical range of words Cisco could use when selecting CLI commands.[27] For example, the use

by legacy systems from DEC and others, including William Yeager's SUMEX software CLI, of

different command modes and prompts to manage access to "privileged" and "non-privileged"

commands and convey to the user what mode they are presently in, the use of hierarchical and

structured CLI command syntaxes with short descriptive verbs like "clear" and "show," and the

use of context-specific help systems, auto-completion, and command abbreviation functionality

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[27] As stated in my Opening Report, I understand that certain copyright defenses like *scenes a faire* are evaluated at
the time the asserted work or asserted aspect thereof was purportedly created. Many of the asserted aspects of
Cisco's works were purportedly created long after Cisco was incorporated, and well into the 1990s and 2000s. *See*
Exh. F to Cisco's Interrogatory Responses.

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to aid the user in using a CLI were all *scenes a faire* (namely, standard, common, and obligatory) to the implementation of a CLI at the time the first Cisco CLI was created, and certainly were widely accepted programming practices within the networking industry when each asserted aspect of the Cisco CLI was thereafter added to Cisco's software.

90.   Moreover, Cisco's own discovery responses show that many of the asserted CLI features were purportedly created in the 1990s and 2000s. *See* **Appendix M** (a modified version of the most recent version of Cisco's Exhibit F to its interrogatory responses, sorted by the "earliest document date"). Since certain copyright defenses including *scenes a faire* and merger are evaluated at the time the allegedly copyrighted work (or asserted element thereof) is created, the external factors relevant to those copyright defenses are even more compelling when viewed in the context of the late 1990s and thereafter given the large number of competing router and switch CLIs (*e.g.*, from DEC, Redback Networks, Extreme Networks, Unisphere, Juniper JUNOSe, Dell, and others) that emerged during that time period with CLI features that overlap with the asserted features in this lawsuit, and the many more years of use and acceptance within the networking industry of hierarchical CLI commands syntaxes, as well as CLI command keywords that use well-known and industry-standard technical terms like "ip," "bgp," "snmp," "ospf," "neighbor," "router," and others. *See* **Amended Appendix K** (identifying well-known technical terms and and industry-standard terms used in the disputed CLI commands).

> A.   *Prof. Almeroth's opening report ignores several differences between the asserted and accused aspects of the Cisco and Arista CLIs that refute a finding of copyright infringement.*

91.   I understand that the scope of copyright protection afforded to the asserted elements of Cisco's CLI (if there is any protection to begin with) is disputed by the parties, and that non-protected elements of the asserted aspects of Cisco's works must be filtered out before

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comparing the works as part of an infringement analysis. I also understand that the amount of

similarity required to find infringement is different if an asserted work is entitled to only "thin"

copyright protection, which would require virtual identical copying to be shown.

92.   Prof. Almeroth's report readily acknowledges several differences between the

asserted CLI elements in Cisco's products, and the accused CLI elements in Arista EOS. For

example, Prof. Almeroth notes in his Exhibit Copying-2 (last column on the right) that certain

asserted Cisco command abstractions are only "similar" to accused EOS command abstractions.

See, e.g., Exhibit Copying-2 to Almeroth Opening Report at 58 (EOS does not support the "isis

passive interface" command abstraction, and Cisco accuses a different "passive-interface"

command abstraction), 75 (EOS does not support the "priority1" and "priority2" command

abstractions, but uses different command abstractions with the additional word "ptp")[28], 87 (EOS

does not support the "show interfaces flowcontrol" command abstraction, but uses a different

command abstraction without "interfaces").[29] I agree that those command abstractions are not

the same.

93.   However, even for the "command abstractions" that Prof. Almeroth claims are

identical, Exhibit Copying-2 to the Almeroth Opening Report completely ignores important

differences between the disputed Cisco CLI commands and the accused Arista CLI commands.

For example, Prof. Almeroth lists "ip domain name" (Cisco's asserted command abstraction) and

"ip domain-name" (the accused Arista command abstraction) as being "identical" in Exhibit

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[28] I note that the asserted Cisco command abstractions "priority1" and "priority2" were listed as "ptp priority1" and "ptp priority2" in Exhibit F to Cisco's discovery responses, as well as in Exhibit 1 to Cisco's Second Amended Complaint. Prof. Almeroth does not explain why this changed in Exhibit Copying-2 to his Opening Report.
[29] The *accused* command abstraction, "show flowcontrol," is supported by several third-party vendors, including Dell (*see* DELL-ANETSUB00114148 at Page 14), Edge-Core (*see* EC000499 at Page 283), and NETGEAR (ARISTANDCA00260599 at Page 102, and ARISTANDCA00279773 at Page 423). *See* Amended Appendix H.DE, Amended Appendix H.EC, and Amended Exhibit H.NG.

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Copying-2, when they differ in hyphenation.[30] Similarly, Prof. Almeroth lists "clear mac-address-table dynamic" (Cisco's asserted command abstraction) and "clear mac address-table dynamic" (the accused Arista command abstraction) as being "identical" in Exhibit Copying-2, when they differ in hyphenation. Prof. Almeroth also lists "show policy-map control-plane" (Cisco's asserted command abstraction) and "show policy-map type control-plane" (the accused Arista command abstraction) as being "identical" in Exhibit Copying-2, when they contain different words. And Prof. Almeroth lists "show policy-map interface" (Cisco's asserted command abstraction) and "show policy-map interface type qos" (the accused Arista command abstraction) as being "identical" in Exhibit Copying-2, when they contain different words. I do not agree with Prof. Almeroth that these command abstractions are "identical" as he indicates in Exhibit Copying-2 to his opening report.

94.   I also note that I could not find the asserted and accused command abstraction "timers throttle spf" in the Arista User Manual Version 4.15.3F (Nov. 20, 2015), and I must assume Prof. Almeroth also could not find it since the page number is left blank for this command abstraction in Exhibit Copying-2 to the Almeroth Opening Report. *See* Arista User Manual Version 4.15.3F (CSI-CLI-06302874).

95.   Moreover, as shown in **Appendix N**, which shows excerpts from the Arista User Manual for every accused command abstraction showing the full command syntax, the actual CLI commands supported by the Arista EOS CLI is, for the vast majority of accused command abstractions, very different and far more complicated from what Prof. Almeroth lists out and accuses in his Exhibit Copying-2. These differences between the full syntax of the accused

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[30] While Exhibit F to Cisco's discovery responses and Exhibit 1 to the Second Amended Complaint listed "ip domain-name" as Cisco's command abstraction, Cisco's command reference manuals appear to show "ip domain name" (without the hyphen) as a command abstraction. *See* CSI-CLI-00220355 at Page 375. I have amended Appendix H for several vendors to include both the asserted "ip domain name" and accused "ip domain-name" command abstractions.

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Arista CLI commands and the accused command abstractions shows how insubstantial the accused command abstractions are to the actual CLI commands supported in EOS, and how *dissimilar* the asserted and accused CLI elements are when one looks at the actual full syntax, including all optional parameters, of the asserted and accused command abstractions[31]. Moreover, the Cisco documented command syntaxes are also different from the asserted command abstractions, and often differs between Cisco operating systems. The fact that neither Cisco nor Prof. Almeroth has identified which specific documented Cisco command syntax corresponds to each asserted command abstraction, and the specific Cisco manual it appears in, is another omission in Cisco's assertions. For example, Cisco asserts two different "show ip bgp neighbors" command abstractions (*see* Exhibit Copying-2), but does not show where those two different command abstractions are documented anywhere.

96.   Similarly, Prof. Almeroth readily acknowledges that the asserted Cisco command modes and prompts differ on their face from the accused Arista EOS command modes and prompts. *See* Almeroth Opening Report ¶ 183 (acknowledging that two of the modes are not identical because Arista chose to use "EXEC" instead of "User EXEC" and "Privileged EXEC" instead of "EXEC"); *see also* Exhibit Copying-4. I agree that those modes are not the same.

97.   However, Prof. Almeroth ignores other dissimilarities in his report. For example, Prof. Almeroth claims that "there are no differences" between the command prompts in Cisco's CLIs and the Arista EOS CLI, except that for Cisco's router prompts (which use the term "router" in the prompts), Arista's prompts use the term "switch." *See* Almeroth Opening Report

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[31] Appendix N lays out in a table the command abstractions for Cisco and Arista, then shows the Arista Manual excerpt for the command in question. In the final column there is a "Yes" or "No" that indicates whether the command abstraction is a valid command on its own; in other words, the "Yes" or "No" indicates whether the command abstraction is an actual issuable command as it is written. Note that even in the cases where a command has a "Yes" in the last column, the valid command itself is often just one form derivable from the listed regular expression that often includes many more possible inflections.

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¶ 184. The *actual* Arista EOS CLI command prompt shown to users of an actual Arista device, however, is configurable and defaults to the host name of the device. *See* CSI-CLI-06302874 (Arista EOS Manual Version 4.15.3F at 273, showing how the prompt is configurable and that the default is %H%P[32]). Therefore, with the host name shown, the prompt will actually appear something like "host-name.dut103(config)#" (this is the example shown in the Arista manual). *Id.* The same is true for Cisco command prompts. Therefore, if the default Cisco and Arista command prompts are shown side by side, they will not be identical as Prof. Almeroth contends. Indeed, Prof. Almeroth's own Exhibits prove that his contention above (that the EOS switch will have prompts such as "switch>" and "switch#") are incorrect: in every instance where Prof. Almeroth captured output from an Arista switch, the prompt was "localhost>" or "localhost#". This makes sense: the default Arista EOS prompt is the hostname, which here was set to "localhost."   Only in the Cisco captures was the prompt "Switch>" or "Switch#". (*See* Almeroth Opening Report ¶¶ 132-133 and Exhibit Copying-7, all files) Similarly, he contends that the Arista EOS Interface Mode prompt is "switch(config-if)#" *see Id*., Exhibit Copying-4 to the Almeroth Opening Report; *Id.*, at ¶ 182 (table). This is incorrect: in Interface Mode the Arista EOS prompt will contain the name of the interface being configured. This is, in fact, a feature of Arista EOS that I find quite useful: if I am in Global Config mode and I type "int eth 1", my prompt will change to "localhost(config-if-Et1)#", not "switch(config-if)" as Prof. Almeroth contends. In fact, it would appear that Prof. Almeroth is aware of this Arista feature since it appears in multiple places in his captured Arista EOS sessions: See Exhibit Copying-7 to the Almeroth Opening Report, file "arista-7010.txt" (where "localhost(config-if-Et1)#" appears three times) and file "arista-7554.txt" (where "localhost(config-if-Et3/1/1)#" appears three times).

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[32] This "%H%P" means that the prompt will be "%H" or the current hostname of the switch, followed by "%P" which will be either ">" or "#" according to the current mode of the CLI.

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98.   Prof. Almeroth states that he personally verified that the prompts are identical between Arista EOS and Cisco IOS ("I independently verified the information in Exhibit C and agree with Cisco that Arista, in fact, uses these same command modes and prompts", Almeroth Opening Report ¶ 178), yet he somehow does not notice that *he never once* encountered the accused Cisco IOS prompt when conducting his experiments using an Arista EOS device.

99.   With respect to the asserted and accused command hierarchies, Prof. Almeroth does not even perform a comparison analysis between any particular command hierarchy in any asserted Cisco work, and any particular command hierarchy in any particular release of Arista EOS. Exhibit Copying-5 to the Almeroth Opening Report does not provide this information, nor is this analysis anywhere in the body of Prof. Almeroth's opening report. Instead, Prof. Almeroth simply groups together a subset of the asserted and accused command abstractions into eleven different lists—specifically, those that start with the first command keywords of "aaa", "bgp," "clear," "dot1x," "ip," "ipv6," "neighbor," "show," "snmp-server," "spanning-tree," and "vrrp"—and labels each list as the "'aaa' hierarchies", the "'bgp' hierarchies", and so on. *See* Exhibit Copying-5 to the Almeroth Opening Report; *see also id.* ¶ 186 (expressly stating that "I understand that Cisco contends that Arista copied the following command hierarchies as well" and listing out these eleven hierarchies by the first command keyword).

100.   Prof. Almeroth does not separate out the different command abstractions that are found only in certain Cisco operating systems (like Cisco NX-OS), but are not found in others (like Cisco IOS), and simply lumps together all command abstractions that start with a common first command word, regardless of which Cisco operating system (or version thereof) it is found in. *See* Exhibit Copying-5 to the Almeroth Opening Report. As a result, Prof. Almeroth has not demonstrated (and it is not even clear he contends) that all CLI commands that start with "aaa"

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are in a single command hierarchy, regardless of what Cisco IOS (and particular versions

thereof) they are found in, or whether there are, for example, multiple "aaa" hierarchies within

his list. The answer to this mystery is not found anywhere in in the Almeroth Expert Report for

any of the eleven hierarchies he lists in Exhibit Copying-5, and in Paragraph 186 of his expert

report.

101.   Moreover, Prof. Almeroth does not identify any command modes in Exhibit

Copying-5 to his opening report for any of the asserted Cisco command abstractions or the

accused Arista command abstractions, despite contending in his report that "[e]ach command

hierarchy is associated with a configuration mode[.]" Almeroth Opening Report ¶ 189.

102.   As a result of these omissions, Prof. Almeroth has provided no analysis in his

opening report showing or identifying any specific "aaa", "bgp," "clear," "dot1x," "ip," "ipv6,"

"neighbor," "show," "snmp-server," "spanning-tree," and "vrrp" hierarchies that are (1) found in

any single asserted Cisco registered work (*i.e.*, in a specific version of a specific Cisco operating

system) and (2) associated with a particular Cisco command mode or configuration mode. He

has also failed to provide any side-by-side comparison showing specific Cisco command

hierarchies (supported by a particular version of a Cisco OS, and associated with a specific

command mode) on the one hand, and where that specific command hierarchy is found in any

specific Arista EOS version.

103.   Finally, I note that there are many differences between the asserted and accused

CLI features that can be seen from the face of Exhibit Copying-3 (command output comparisons)

and Exhibit Copying-6 ("Help" description copying assertions) to the Almeroth Opening Report.

Indeed, in Exhibit Copying-3, it is often the case that the text flagged by Prof. Almeroth in red

boxes (which I assume indicates what Prof. Almeroth contends are the alleged similarities) is a

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very small portion of the entire command output, much of which is ***not*** the same between Arista and Cisco. The same observation applies to Exhibit Copying-1, which purports to show side-by-side comparisons of user documentation. I further note that for the accused excerpts of user documentation in Exhibit Copying-1, the flagged passages do not appear to be present in the current version of the Arista User Manual.

> **B.   *Contrary to Prof. Almeroth's assertions, the selection of command keywords in the asserted Cisco IOS CLI command abstractions was constrained and dictated by many external factors.***

104.   Prof. Almeroth repeatedly asserts that there were many alternatives available when selecting keywords for use in the Cisco IOS CLI. For example, Prof. Almeroth states: "[...] the Cisco engineers faced ***endless aesthetic choices*** for each of the numerous commands now found in the Cisco IOS CLI [...]" Almeroth Opening Report ¶ 51 (emphasis added). He further states "[...] any one of the asserted command expressions could, in theory, be ***any random set of words or characters***, and yet the command would still work." *Id*. at ¶ 101 (emphasis added). He also opines that, instead of "show" various other choices were available including "display," "print," "watch," "view," or "info" and then concludes "[o]ther words such as 'steve' or 'book' or 'phone' would be used just as well [...]" *Id.* at ¶ 111. Prof. Almeroth seems to be of the opinion that using "steve" in place of "show" is a viable option for a networking operating system's CLI. I strongly disagree.

105.   While, technically speaking, there are alternatives to the word "show" that could conceivably be used in its place in a CLI command, "show" has several advantages over them: it is colloquial, familiar to any English speaker, only 4 characters long, and it was already in widespread use well before Cisco was founded for the same purpose in the DCL CLI as

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discussed above.[33] I am unaware of any analogous word being used as of the 1984 time period

for the purpose served by "show" commands other than the word "show".[34]

106.   Aside from what might be technically possible (and, contrary to Prof. Almeroth's

assertions, there *are* technical constraints that apply to the addition of new CLI commands[35]), the

more important question—particularly with respect to *scenes a faire*—that Prof. Almeroth leaves

unanswered in his opening report is: Why would Cisco depart from using the standard command

word "show" and replace it with "steve" or any less familiar term as Prof. Almeroth suggests?

107.   There is a reason Cisco has, in general,[36] followed the guidance of its Parser

Police Manifesto and selected CLI command words that are clear, self-explanatory, and already

known and familiar to CLI users, as opposed to different or fanciful words. A world in which

every network operating system uses a different word for "show" (or even worse, a fanciful word

like "steve" or "book" in place of "show") would lead to frustration, confusion, and errors for

engineers who have to deal with these various devices. Training costs would rise,

misconfigurations would be even more common than today, and interoperability would become

much more difficult. The only benefit in this scenario would be to certain companies who

benefit from vendor lock-in, as forcing companies to create different CLIs would discourage the

use of multi-vendor networks given the inefficiencies and added burdens of managing

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[33] Even the user interface CLI for the Quasar print controlling software that Mr. Lougheed used in the early 1980s at Stanford supported a "show" command hierarchy with multiple show commands that serve the same purpose as the "show" commands disputed here. *See* Opening Report ¶ 574.

[34] While Prof. Almeroth suggests that "watch" is a substitute for "show," I note that the "watch" command was already in use in Unix with different semantics, and for a different purpose. Specifically, the "watch" command in Unix allows the user to repeatedly display the status of a process. Unix users familiar with the "watch" command in Unix would no doubt be confused if "watch" was used as a substitute for "show" as Prof. Almeroth suggests.

[35] The technical limitations on the selection of CLI commands are addressed in my Opening Report. *See, e.g.*, Opening Report ¶¶ 605-608 (discussing the limitations of the CLI parser, duplicate CLI commands, and collisions that may result from adding a new CLI command). I also offer further limitations later in this Rebuttal Report.

[36] In some circumstances Cisco selected awkward phrasing and vocabulary for CLI commands, but not surprisingly, those are not at issue in this case.

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completely different CLIs for every vendor (which would, for example, require completely

different configuration scripts to be managed for each CLI).

108.   In my opinion, neither the public nor Cisco's interest would be served if Cisco, or

any other networking vendor, could prevent others from using particular words (or combinations

of words) in CLI commands, prevent others from organizing CLI commands in a hierarchical

manner, or prevent others from separating commands into different modes. This is presumably

why Cisco never objected to so many other switch vendors using Cisco's "industry standard

CLI" commands for so many years.[37]

109.   By suggesting that alternatives to "show" could have been used by Cisco (and

should have been used by Arista), Prof. Almeroth appears to endorse Cisco's position that each

vendor could and should be required to use an alternative command word when adding new CLI

commands, or else risk being accused of copying (and infringing the purported copyright of)

some other vendors' commands that they may already have some familiarity with or exposure to.

But this position assumes that there is an endless supply of viable alternatives for command

words like "show" and "clear" that each vendor could claim as its own, which is not correct.

See, e.g., Arista Corp. Dep. Tr. (Adam Sweeney) (June 1, 2016) at 640:1-645:15 (explaining the

absurd consequences of Cisco's position if vendors are forced to come up with a different word

other than "clear" for "clear" commands, and cannot reuse any synonym already used by a prior

vendor).

110.   I strongly disagree with Prof. Almeroth's suggestion that any vendor should be

permitted to claim copyright ownership over the use of, and restrict others from using, accepted

and widely understood command words like "show" and "clear," or industry standard and well-

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[37] *See* Opening Expert Report of William M. Seifert, ¶¶ 10-14, 71-80

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known technical terms like "ip," "ipv6," "arp," "bgp," ospf," "neighbors," and other common

and widely understood technical words highlighted in Appendix K to my Opening Report.

111.   Therefore, while Prof. Almeroth is technically correct that a computer could be

programmed to recognize "steve" or "book" or "phone" as its "show" command, to suggest this

actually be done in the CLI of a usable commercial product is preposterous. The proof is in the

fact that no networking company uses such absurd naming rules. In my experience with a large

number of CLIs[38], never have I seen a command word that did not at least *attempt* to represent or

describe the object or action it was directed to.[39] To suggest that "steve" is a viable alternative

for "show" deeply misunderstands the role of command words in a CLI and the importance of

making a CLI usable by human beings.

> **C.   The external factors that limited the command keywords used in the asserted Cisco IOS CLI underscore the application of the scenes a faire doctrine.**

112.   As explained in my Opening Report (*see* pp, 17-18, 310-322), the *scenes a faire*

doctrine (which I understand is applied to the alleged expression at the time of creation) renders

even expressive elements ineligible for copyright protection if they are standard, stock, or

common to a topic, or if they necessarily follow from a common theme or setting. I understand

that in the computer context, *scenes a faire* includes program elements that are dictated by

external factors such as the specifications that the expressive elements comply with, or widely

accepted practices within the computer industry. These factors include hardware standards and

mechanical specifications, software standards and compatibility requirements, computer

manufacturing design standards, industry programming practices, and practices and demands of

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[38] I would be hard-pressed to list every CLI I've ever used, but I would guess the count is between 50 and 100.

[39] Indeed, as noted earlier in this report, Cisco's own Parser Police Manifesto makes it clear the CLI commands must be self-explanatory and use familiar, industry standard words and acronyms, which is a sensible approach that is also followed by Arista.

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the industry being serviced. I understand that the purpose of this doctrine is to exclude from

copyright protection expression whose creation flowed naturally from considerations external to

the author's creativity.

113.   I already responded earlier in this rebuttal report to Prof. Almeroth's opinions

regarding the purported creativity underlying the addition of asserted aspects of the Cisco CLI to

Cisco's software, and explained why I disagree with Prof. Almeroth's opinions. The same

reasons and evidence underlying my disagreements with Prof. Almeroth on the copyrightability

of the asserted aspects of the Cisco CLI apply equally to why the *scenes a faire* doctrine bars a

finding of copyright infringement for the asserted CLI features.

114.   It is my opinion that the initial Cisco CLI Mr. Lougheed created was very similar

to the DEC DCL, TOPS-20 EXEC, and Unix bash CLIs that predate Mr. Lougheed's work.[40] In

this sense, as I understand the *scenes a faire* doctrine, it already precludes any expressive

elements from copyright protection because they simply arose from a common theme: the

behavior of that CLI along with its hierarchical organization and command-line prompts was

already well-established.

115.   As time went on, Cisco added thousands more CLI commands to it products. Of

course Cisco did not rewrite IOS each time it added a new command; it simply extended the

parser to accept each new command, then wrote the underlying functionality to support it. This

means that whatever constraints were already in the parser limited the kinds of commands that

could be added. As an example, consider a new keyword containing a space such as "ip delay".

It would be currently impossible add "ip delay" as a single keyword in the IOS parser because

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[40] Prof. Almeroth asserts that Mr. Lougheed documented the Cisco "hierarchy" arrangement in a 1986 User Guide. CSI-CLI 00358622-CSI-CLI 00358654. This early guide, however, shows very few commands and nothing at all similar to the "hierarchy" that Cisco now claims. Doubtless this was because the device, circa 1986, was more primitive and had far fewer features. But this underscores my opinion that the claimed "hierarchy" Mr. Lougheed claims as his own creation is merely the "idea" of organizing commands by keyword.

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the parser currently breaks commands into tokens according to where spaces are found in the input. The parser could be modified to allow spaces in keywords, but this would be a major overhaul. As a second example, consider the addition of a new keyword "Show", which is the same as the "show" keyword but the first letter is capitalized. The parser is currently case-insensitive so it would have to be modified to allow case-sensitivity (which is probably a very bad idea). As a final example, consider a CLI command that has the form "a b c" or "a a b b c c" or "a a a b b b c c c", etc., where a, b and c are CLI command words and there must be the same number of a's, b's and c's in a valid command.   The Cisco parser, as it currently is written, cannot accept this kind of rule.[41] Therefore, the parser as-written places certain constraints on what future CLI commands can be added.

116.   After the Cisco CLI was well-established and there was a significant customer base into the 1990's and 2000's, more constraints came to bear on future additions to the IOS CLI. New commands needed to follow existing hierarchies (a new command to show information should start with "show" and a new command that clears information should start with "clear", etc.). A compound keyword, formed as the concatenation of two single words, needs to be joined into a single word without spaces in order for the parser to properly understand it as a token. This compound word could be written in a variety of ways. For example, "clear cache" could be written as "clearcache", "clearCache"[42], "clear_cache", or as "clear-cache". Indeed, all four of these conventions are commonplace in Computer Science when we wish to conjoin two words. But virtually all of the Cisco CLI uses just the last form:

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[41] Although I have not extensively reviewed any of the IOS parsers Cisco has produced, I did not see support for a context-sensitive grammar. The example here using a, b, and c, is one example of a context-sensitive grammar. Parsing these is fairly challenging. *See, e.g.* Dragon Book (ARISTANDCA00001453).

[42] This is often called "Camel Case" because the uppercase letters in the middle of the compound word look like the humps on a camel.

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"clear-cache" and an attempt to introduce a new compound word with one of the other

conventions would likely be rejected by other Cisco engineers[43].

117.   In my opinion, extending the Cisco CLI even in 2016 would entail very few

creative choices. As an example, consider a hypothetical new network protocol called "xyz" that

was developed by the IETF, and imagine that Cisco then decides to implement xyz in its CLI. It

is very unlikely that the Cisco implementor is going to choose something like "display xyz" to

show the various states of the xyz protocol. A CLI needs to be consistent, intuitive, uniform and

it should require a minimum of memorization. Clearly a "show xyz" command family should be

used, in order to be consistent with the hundreds of other commands that start with "show" in the

IOS CLI. In fact, I would contend that the virtually-forced choice of "show xyz" embodies zero

creativity since any other command prefix would be against the principles just listed. Similarly,

"clear xyz" would very likely be used to clear information related to the xyz protocol.

Commands would be introduced starting with "xyz" to set options for the xyz protocol, and other

commands would begin with "no xyz" to undo those options. To be sure, there would very

likely be a few decisions that needed to be made: Should xyz have its own mode and prompt?

What options should be supported for the new CLI commands? Should Cisco invent new

keywords unrelated to the words in the xyz RFC? But these choices are highly constrained by

the "xyz" functionality, by the way the existing CLI is structured, by rules implicit in the parser,

and by the rules and guidelines set forth in the "Parser Police Manifesto." So, in my opinion,

very few actual choices remain and the amount of creativity involved is quite small.

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[43] That said, the Parser Police Manifesto laments "b_channel" as being included in the IOS CLI (note the underscore). (CSI-CLI-00358164) But this is rare: in the overwhelming number of cases, the CLI follows the "hyphen convention" for compound keywords.

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118.   Cisco's Parser Police Manifesto (CSI-CLI-00358164) lists several rules and best-practices that should be followed for consistency and uniformity with the existing CLI. It gives guidelines on when two words should be concatenated (with a hyphen) or not. It suggests extracting out common words (e.g., using "debug isdn [q921 | q931]" instead of "debug [isdn-q931 | isdn-q921]" and using "banner [access | motd | exec]" instead of "exec-banner", "motd-banner", "access-banner"[44]). And it reinforces the notion that a given command like "ppp multilink" should be undone via "no ppp multilink".[45] These rules provide yet another set of constraints on engineers who implement new CLI commands: any significant departure from the rules and guidelines of the Parser Police Manifesto would likely be rejected by the CLI watchdogs who (rightly) feel that the uniformity and consistency of the CLI is a high priority. The creativity of the engineer, therefore, is expressed in writing the underlying implementation for the *functionality* of a given command, not in the highly-constrained procedure of deciding on the command's CLI syntax.

119.   As extensively discussed in my Opening Report, Cisco's corporate witness along with employees and ex-employees of Cisco who are credited with the creation of CLI commands have substantiated my opinion: they have admitted that the choices made when creating a new CLI command are largely constrained by the requirement to maintain consistency with the existing CLI. They have also admitted that many CLI terms are simply taken from standards from IETF RFCs and IEEE standards, rather than being created from whole cloth. (*See, e.g.*, testimony from Lougheed, Patil, and Li on this topic as recited in my Opening Report ¶¶ 608-

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[44] Note that "banner motd" is one of the 514 command Cisco accuses Arista of copying, even though the Parser Police Manifesto suggests the syntax is virtually forced by its rules of syntax.
[45] It is extremely common in the IOS CLI to reverse the effect of a command "X" by using "no X".

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628.) This supports my view that the amount of creativity in creating new CLI commands is very small given the tight constraints under which such commands are created.

120.   Cisco has not offered any significant evidence or testimony to explain their claim that substantial creativity was required in the creation of the Cisco IOS CLI, and Prof. Almeroth has offered no further insight other than to repeat Cisco's arguments (e.g., that "show" could have been replaced by "steve"). There has been testimony by Cisco CLI command creators that attempts to explain the purportedly creative process underlying the creation of a handful of CLI commands, but for the vast majority of the command abstractions asserted and accused by Cisco, there has been no evidence or testimony provided to substantiate Cisco's claims regarding creativity or originality. In his Opening Report, Prof. Almeroth recites a long list of deposition testimony from a variety of sources in an attempt to support his opinion that creativity is involved in creation of CLI commands, but none of the recited testimony Prof. Almeroth includes sheds any light on the creativity purportedly used in the creation of the asserted CLI commands[46]. In his 30(b)(6) deposition, Mr. Remaker admitted repeatedly that he has no idea and no knowledge of what any other CLI authors considered at the time they added new CLI commands. *See* Cisco Corp. Dep. (Remaker) at 125-133. When asked about the thought process used by David Carrel, author of "aaa accounting", Mr. Remaker responded "I do not know David Carrel's thought process when he selected that command." When asked if he knew the thought process used by Michael Vowles, named author of a number of Cisco CLI commands, Mr. Remaker responded "I do not." When asked about the thought process used by named CLI authors Farinacci and Marques, he similarly could not claim any knowledge of the thinking employed by those engineers. And when asked if he could speak to the thought process used in

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[46] The one exception here is Mr. Remaker's "show inventory" command, whose creation is discussed in those excerpts. With respect to the remaining 500+ asserted CLI commands, nothing further is provided.

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the creation of *any* of the asserted and accused CLI commands, he admitted he did not know: "I don't think I can speak to a third party's thought process." *Id.*, p 135.

121.   He also states that he does not know of any rules or guidelines used in the creation of the hierarchies, modes or prompts of the Cisco CLI (*Id.,* pp. 88-98), repeatedly answering "I don't know" when asked if such rules or guidelines were in place or enforced when creating hierarchies, modes and prompts. Yet in the apparent absence of any institutional memory about the creation of the command abstractions, hierarchies, modes and prompts, Cisco still insists that creativity and originality was applied in their creation. Cisco has not offered any further evidence or testimony to support their contentions and Mr. Remaker appears to be the best resource available to answer these questions: "**Q.** Do you believe there is anybody within Cisco who knows more about the historical creation of the 500 plus command line expressions identified in Exhibit 431 other than you? **A.** No." *Id.*, p. 214.

122.   Prof. Almeroth repeatedly contends that choosing a particular CLI command from a list of plausible choices is "subjective." (Almeroth Opening Report ¶¶ 58, 101-112) I would certainly agree that *some* decisions in the creation of CLI commands are subjective, but this applies only when there is a choice to be made, of course. As I opine above, in the majority of cases conformity and consistency, along with external factors, can effectively remove all choice when deciding on a new CLI command. Once again, a Cisco engineer really cannot elect to use "display" instead of "show" even if it is a near-equivalent English word. In the cases where there is a choice, I agree that some degree of subjectivity may apply, but I disagree with Prof. Almeroth's implication that subjectivity implies creativity. This is because the "choice" available to the engineer is always a limited one, driven by practical constraints. Thus although two engineers may differ in their view as to whether to use "show ip route" instead of "ip print

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route" the selection of one is both constrained and ultimately driven by practical considerations.

Furthermore, just because some choice is made does not mean that selection is creative. For

example, I prefer red wine over white wine. That is a *subjective choice*: I simply enjoy the taste

of it over white wine. But I would never claim that my preference for red wine is somehow

"creative."

> **D.   The use of one to two word industry standard terms and phrases to succinctly describe the functionality of a CLI command is also subject to the "words and short phrases" doctrine.**

123.   Prof. Almeroth points out that there is no officially codified standard requiring

any set of CLI commands or behaviors. I agree, but this is beside the point. The lack of (say) an

IEEE or IETF document specifying that "show version" must be accepted by a network device

does not thereby entitle "show version" to copyright protection. Of the 508 command

abstractions asserted and accused by Cisco (as taken from Prof. Almeroth's Opening Report), 24

of them are a *single-word*[47] and none is longer than five words.

Number of keywords in Command Abstraction	*Number of Command Abstractions of this Length*
1	24
2	188
3	208
4	77
5	11

---

[47] These 24 are address-family, aggregate-address, channel-group, control-plane, default-metric, domain-id, is-type, log-adjacency-changes (three times), mac-address, maximum-paths (twice), passive-interface (twice), priority1, priority2, private-vlan, route-map, router-id (twice), set-overload-bit, spf-interval, storm-control

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124.   Notice from the chart above, that 420 of the 508 command abstractions Prof.

Almeroth lists (or about 82% of them) are *three words or fewer*. As I explained in my Opening

Report, of these short strings of words, most are not original to Cisco.   Furthermore, note that

Cisco's list of 508 command abstractions does not literally appear in any registration, nor in any

manual, nor in any source code. In fact, to my knowledge, it does not literally appear anywhere

outside of Cisco's pleadings and Prof. Almeroth's Opening Report.

> **E.   *Prof. Almeroth ignores the existence of de facto industry standards in the networking industry, one of which is the industry-standard CLI used by Arista and many other vendors in the networking industry.***

125.   Prof. Almeroth contends that there is "no industry standard for Cisco's

copyrighted works." Almeroth Opening Report, Section VII, ¶¶ 231-253. However, it appears

that Prof. Almeroth is defining "industry standard" in an unconventional way: he argues that

because Cisco has never proposed its CLI to a standards body, it cannot be considered as an

"industry standard." *Id.*, ¶ 247. As I pointed out in my Opening Report, many industry

standards in computer science are de facto standards: they become an "industry standard" merely

by the weight of their presence, adoption, and acceptance by vendors and customers in an

industry. *See* Opening Report ¶¶ 82-90. In my Opening Report I listed several examples of such

standards, including the QWERTY keyboard, the Hayes AT command set, and several IETF

RFCs, including many de facto industry standards that Cisco itself follows (or followed before

they were official standards). Prof. Almeroth claims he has "seen no evidence that Cisco's CLI

is part of an industry standard" (Almeroth Opening Report ¶ 245), in spite of the fact that Cisco

has referred to its CLI as "industry standard" in its published literature. Again, it appears Prof.

Almeroth has reached a conclusion without either considering, or explaining, the substantial

evidence exchanged in this case case of companies, including Cisco itself, referring to Cisco-like

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CLI as an industry standard. He provides no explanation for his opinion other than his ignorance

of evidence to the contrary.

126.   Beyond claiming that no industry standard covers Cisco's CLI, Prof. Almeroth

goes a step further and claims there is no industry standard for networking CLIs whatsoever. *Id*.,

¶ 253. Here I strongly disagree: there is incontestably a *de facto* standard in the industry for

networking operating system CLIs. Virtually anyone who has used a Brocade, Dell, Arista,

Cisco, etc., device can simply sit down at a console and make fairly quick progress doing basic

things, such as entering "enable" to get to Privileged EXEC mode, then "conf t" to get to Global

Config Mode. He or she can set an IP address on an interface, show a routing table, check a

DNS name, and so forth. Commands can be abbreviated, TAB can be used to expand them.

Hitting "?" will display help, even in the middle of a command, and backspace will erase one

character. Ctl-A moves the cursor to the front of the line, Ctl-E to the end. As the user enters

certain commands, the mode and prompt will change. In EXEC mode, the prompt will be the

hostname of the device followed by a ">" symbol, and after "enable" is typed, it will change to

the hostname followed by "#". This is the standard behavior exhibited by a wide range of

different products from a wide range of different vendors. In my Opening Report, I

painstakingly analyzed the array of other vendors who support the same or similar CLI

commands, hierarchies, modes, and prompts. *See, generally,* Opening Report; *see also id.* ¶¶

178-198, all sections on vendor comparisons, and Appendices D, E, F and G. It is beyond

dispute that there exists a basic set of functionality that includes commands, hierarchies, modes

and prompts as well as functionality not accused (abbreviation, TAB expansion, "?" behavior,

editing commands) that are shared by a wide variety of vendors throughout the industry. These

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shared characteristics constitute a *"de facto industry standard,"* Prof. Almeroth's contentions notwithstanding.

127.   As explained in my Opening Report, Cisco had actively advertised its CLI as "industry standard," had publically and repeated affirmed its commitment to open standards and interoperability[48], had never asserted any claims to holding a copyright over its CLI[49], and in fact knew about the widespread use of CLIs resembling TOPS-20, DCL, bash, and its own CLI. By the time Arista sold its first product running EOS in 2008, the industry standard was well-established[50]. Cisco, instead of asserting its purported CLI copyright, participated with other vendors at conferences, cooperated with these vendors in establishing new networking standards within the IETF, and in a few cases acquired the companies whose practices they now view as copyright infringement (*e.g.*, Procket and Tail-f Systems).

128.   Indeed, with respect to Tail-f, I have interacted with executable versions of the NCS/NSO software that were recently provided to Arista by Cisco, including using the Cisco-style and Juniper JUNOS-style CLIs, and those interactions confirm the opinions I previously set forth in my Opening Report. *See* Opening Report ¶¶ 441-471 (discussing the Tail-f NCS and Cisco NSO software and the Juniper JUNOS-style CLI and Cisco IOS-XR CLI, as well as Tail-f's and Cisco's ConfD product); CSI-CLI-06360760, CSI-CLI-06360757, CSI-CLI-06360759, CSI-CLI-06360758 (executable files produced in native by Cisco). Moreover, using the executable versions of NCS/NSO software, I was able to navigate through the JUNOS hierarchies using the familiar JUNOS commands, "edit", "up" and "top" to move down and up

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[48] See CSI-CLI-01327019, CSI-CLI-02092956
[49] The notable exception being the Huawei matter, which involved source code theft, an entirely different circumstance to the present matter.
[50] See Opening Expert Report of William M. Seifert, ¶¶ 71-80

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through the various levels of the hierarchies, all the while being shown the familiar JUNOS

prompt in brackets.

129.   I also disagree with Prof. Almeroth's opinion that asserted CLI command

abstractions that are found only in NX-OS, or are not used in Cisco IOS but are supported by

IOS XR, IOS XE, and/or NX-OS, cannot be part of the industry-standard CLI. *See, e.g.*,

Almeroth Opening Report ¶¶ 242-243. As a preliminary manner, many of the commands listed

by Prof. Almeroth as "NX-OS" only commands are in fact supported by third-party vendors,

including vendors that Cisco has stated in public blog posts are fair competitors to Cisco. *See*

Opening Report at Appendices G and H.AD through H.SU (showing, for example, the command

abstractions "clear ip arp", "clear spanning-tree counters", "ip igmp startup-query-interval", "isis

passive", "mac access-list", "priority-flow-control mode", "show ip msdp mesh-group", "show

ipv6 bgp", "show ipv6 bgp neighbors", "show ipv6 bgp summary", "show lacp interface", "show

lacp neighbor", "show port-channel summary", "show ptp clock", "show snmp source-interface",

"show snmp trap", "show spanning-tree blockedports", "show spanning-tree bridge", "show

spanning-tree interface", "show spanning-tree root", "show vlan private-vlan", "show vlan

summary" being used by at least one other third-party vendor). Indeed, several "NX-OS" only

commands are supported by at least eight third-party vendors.

130.   Similarly, for the commands that are supported by IOS XR, IOS XE, and/or NX-

OS, but not IOS, several are also supported by third-party vendors. *See* Almeroth Opening

Report ¶ 243; Opening Report at Appendices G and H.AD through H.SU (showing, for example,

the command abstractions "interface ethernet", "log-adjacency-changes", "show environment

power", "show isis interface", "show lacp counters", "show port-security interface", "show

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radius", and "show spanning-tree mst interface" being used by at least one other third-party

vendor). Again, several of these non-IOS command are supported by at least five other vendors.

131.   This illustrates that the *de facto* industry-standard CLI is defined by its adoption

and use across the industry, and not whether a particular CLI command abstraction is supported

by a particular Cisco CLI. The mere fact that, for example, seven third-party networking

vendors (including three of the vendors that Cisco says are fair competitors) support the "show

lacp counters" command abstraction, and eight third-party vendors (including two of the vendors

that Cisco says are fair competitors) support the "show spanning-tree interface" command

abstraction, illustrates that the industry-standard CLI is not limited to CLI command abstractions

that the Cisco IOS CLI supports (as opposed to Cisco NX-OS, IOS XE, and IOS XR).

132.   Moreover, Prof. Almeroth ignores the fact that many of the "NX-OS only"

commands listed in Paragraph 242 and "not IOS" commands listed in Paragraph 243 of the

Almeroth Opening Report are very similar to Cisco IOS commands. For example, Cisco IOS

supports command abstractions that start with "interface", "ip dhcp", "ip igmp", "ip msdp", "ip

pim", "isis", "log-adjacency-changes", "show ip", "show ipv6", "show ipv6 bgp", "show isis",

"show mac", "show port-security", and "show spanning-tree", as one can see by reviewing

Exhibit Copying-2 to the Almeroth Opening Report. I therefore disagree with any suggestion by

Prof. Almeroth that the commands listed in Paragraphs 242 and 243 of his opening report are

somehow completely different from, and share no similarities with, Cisco IOS command

abstractions.

      F.   ***Prof. Almeroth's opinions confirm that the fair use doctrine and the copyright***
                       misuse doctrine should apply to the asserted aspects of the CLI.

133.   Prof. Almeroth suggests that a given networking device vendor need not use

"show" and could instead use "display," "watch," "print," "view," or "info." (Almeroth Opening

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Report ¶ 111) It would seem that the suggestion here is for each networking vendor to choose its word from a list of reasonable alternatives. As each vendor's choices become publicly known, however, each vendor essentially would have a monopoly to bar other companies from using that word in their CLI because any subsequent user could be accused of copying. This is absurd, of course, and runs counter to how I understand the first factor in the fair use doctrine (the purpose and character of the use).

134.   Prof. Almeroth's suggestion that other vendors use other words for "show" just underscores my opinion that the fair use doctrine, as I understand it, should apply to the asserted aspects of the Cisco CLI: given the very limited number of alternatives, allowing reuse of the most well-known and descriptive keywords should clearly be allowed.

135.   As extensively set forth in my Opening Report, Aristas use of existing CLI functionality, including functionality that resembles the Cisco CLI, is transformative. Arista has not simply re-implemented the industry standard CLI in a copycat switch, marketed as a Cisco knock-off. It instead has designed a completely new switch, both in terms of hardware and software architecture, and features that no other vendor offers.[51] Many of these new features required extensions to the Arista CLI that further differentiate it from other networking CLIs. But beyond this, even long-established CLI commands invoke an essentially different set of underlying functionality: from its unique self-healing modular EOS architecture (which affects every aspect of a device's behavior, including its CLI) to its Linux kernel and exposed bash facility, to its switching fabric.[52]

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[51] Following Arista's lead, other vendors have added features similar to some of Arista's most innovative offerings, well after Arista brought them to market. These other vendors include Cisco. *See*, e.g., Opening Report ¶ 161.

[52] Prof. Almeroth describes Cisco's IOS XE as "modular" (but no other Cisco operating system). To the extent Cisco's IOS XE is relevant in this case, I note that the earliest asserted copyright from IOS XE claims a date of completion of 2008, and the registration was submitted six years later in 2014. Complaint Exh. 23. Arista's publish-subscribe EOS architecture was designed well before 2008.

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136.   Further, while the command abstractions chosen by Cisco share keywords in common with commands found in the Arista CLI,[53] the syntax of the actual Arista commands very often differs from the analogous commands found in the various Cisco CLIs (*see* **Appendix N**). This further supports my opinion that Arista's use of existing CLI features is transformative, and further supports my opinion, also expressed in my Opening Report[54], that for the third fair use factor ("the amount and substantiality of the portion used") the true overlap is minimal.

137.   For similar reasons, Cisco's broad assertions of copyright over what are essentially functional features of its CLI and which constitute methods of operation and systems of organizing commands is, in my opinion, copyright misuse. Via its allegations and infringement contentions, Cisco is essentially attempting to use the copyright system to gain a monopoly on *any* hierarchical mode-based CLI. Prof. Almeroth describes for us what a CLI is ("a text-based input **system**", Almeroth Opening Report ¶ 50, emphasis added), how the parser functions (by **processing** tokens, as explained in Almeroth Opening Report ¶ 84, emphasis added), and how hierarchies are formulated (by **organizing** commands as opposed to not organizing them, as explained in Almeroth Opening Report ¶ 54, emphasis added). But in every respect, these functionalities related to the CLI's *method of operation*. The only expressive aspect of these functionalities is the source code that implements the corresponding features, and the source code implementing these features is indisputably different between Cisco IOS and Arista EOS.

138.   Prof. Almeroth, in ¶¶ 168-169 of his Opening Report, notes that Arista has admitted using the 500+ "command expressions" asserted by Arista. However, as extensively

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[53] As well as with command found in an array of CLIs from other vendors
[54] *See* Opening Report ¶¶ 687-696

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discussed in my Opening Report[55], many of the command abstractions asserted and accused by Cisco in its various pleadings are not used by Arista. Moreover, in many cases those CLI commands bearing a similarity to Arista's CLI commands have a markedly different purpose and implement distinct functionality. And once again, a closer analysis of the specific asserted command abstractions and the full syntax of the associated command reveals many significant distinctions as shown in **Appendix N** to this Rebuttal Report.

139.   Prof. Almeroth concludes that superficial similarities between the Cisco CLI syntax and the Arista CLI syntax proves that the underlying functionalities must be identical: "When I input the commands, the Arista switch running EOS provided an output or response (not an error message) with the same look and feel as if I had inputted the commands into a Cisco device, which tells me that the multi-word command expressions are used in Arista's EOS in **precisely the same way** as they are in Cisco's IOS [...]" (Almeroth Opening Report ¶ 174, emphasis added). As just detailed, a closer analysis is appropriate here because in many cases syntactically-similar CLI commands often have distinct functional differences.

140.   I also note that the vast majority of networking equipment vendors support the same eleven accused command hierarchies identified by Prof. Almeroth in his opening report. *See* Almeroth Opening Report ¶ 186 (listing, as the accused command hierarchy, the "aaa" command hierarchy, "bgp" command hierarchy, "clear" command hierarchy, "dot1x" command hierarchy, "ip" command hierarchy, "ipv6" command hierarchy, "neighbor" command hierarchy, "show" command hierarchy, "snmp-server" command hierarchy, "spanning-tree" command hierarchy, and "vrrp" command hierarchy); *see also* Exhibit Copying-5 (listing disputed command abstractions in eleven separate lists corresponding to these eleven hierarchies). As

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[55] *See* Opening Report ¶¶ 484-497.

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shown in **Appendix L**, each of the eleven accused hierarchies is supported by at least *eight* other

vendors.[56]

141.   In his Opening Report at ¶ 137, Prof. Almeroth states that the Cisco

documentation has long been publically available for anyone to inspect (in order to observe the

copyright notices therein). But Prof. Almeroth has not identified a single registered work in

which his list of command abstractions appear. From my sampling of the registered Cisco

manuals that form part of the registered works, and from my understanding of the Cisco source

code, Prof. Almeroth's command abstractions are in fact cherry-picked words selected from

widely disparate parts of each work. I would also note in response that the features of the Arista

CLI and its manuals have also been publically available for years: Arista's marketing literature

and EOS user manuals are, and have long been, freely available online.

X.   OPINIONS REGARDING OTHER ASSERTIONS IN PROF. ALMEROTH'S OPENING REPORT

A.   *Prof. Almeroth's assertions that Arista copied Cisco source code for any CLI features are baseless, and his citation of source code for his "help" description analysis is both misleading and unnecessary.*

142.   In several instances in his Opening Report, Prof. Almeroth cites to Arista source

code (*see* Almeroth Opening Report ¶¶ 81-87, ¶ 124) and presumably based on these citations,

implies that Arista engaged in some impropriety or copying with respect to Cisco confidential

source code: "Unless otherwise noted, my opinions and analysis apply to all versions of EOS that

Cisco has accused of infringement. As set forth below and in the exhibits accompanying my

report, I have found evidence of copying in every version at issue in this case [...]" Almeroth

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[56] I have also listed the command mode(s) associated with each command hierarchy for each supporting vendor. As noted earlier in this report, neither Cisco nor Prof. Almeroth identified any particular command mode associated with any of the asserted eleven hierarchies listed in Exhibit Copying-5 to the Almeroth Opening Report, and neither Cisco nor Prof. Almeroth identified any particular Arista EOS hierarchies with their associated command modes as being accused.

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Opening Report ¶ 125. However, at no time does Prof. Almeroth cite to any Cisco source code

or any Arista source code, much less perform any side-by-side comparison to substantiate these

insinuations. And the one instance where Prof. Almeroth implies that a literal copying may have

taken place (with respect to the help description texts), he fails to mention that these text strings

are easily available from any Cisco product merely by pressing the "?" key at the various CLI

prompts. Source code was not necessary to obtain access to these help descriptions, and indeed

finding them in the Cisco source code would be more arduous than simply typing a "?" symbol

into the CLI.

143.   Also, although Cisco's late identification of these "help" contentions and the

volume of those contentions have prevented me from fully analyzing the claim, I note that in a

Dell video comparing the Force10 CLI to IOS (which I mentioned in my Opening Report), both

operating systems had a similar help functionality and a number of the descriptions are identical

between the two operating systems, and identical to what Cisco is claiming as its copyrighted

"expression."[57] If Prof. Almeroth were correct that similar help descriptions suggests the use (or

misuse) of Cisco source code, one would have to draw the same conclusions about Force10/Dell,

or any other competitor using those descriptions. And yet to my knowledge Cisco has never

accused Dell of using Cisco source code.

144.   Cisco's late identification of these help descriptions has prevented me from

undertaking a careful and full analysis, but I have used Google to search for a few of the text

strings found in Prof. Almeroth's "Exhibit Copying-6" list. Unsurprisingly, I found that in *every*

case, the accused help descriptions appeared in software, white-papers, marketing materials or

manuals outside of Cisco. For example, I searched for the accused help text "IP ARP table" and

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[57] *See* Dell Corp. Dep. (Cato) Exh. 956 at 0:45; *see also* Opening Report ¶ 300.

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found it used in a non-Cisco tutorial.[58] I tried "IP subnet mask" and found it under a webopedia

article.[59] I tried some longer descriptions, such as "address or hostname of a remote system" and

found it used in literature selling barcode scanners.[60] I feel confident that the vast majority of

these help descriptions are so generic and are formed with such common terms that they can be

found in non-Cisco literature most of the time. I also noticed some claimed similarities that lack

foundation. For example, Cisco claims that its help descriptions "AppleTalk interface status and

configuration," "CDP interface status and configuration," "CEF interface status and

configuration," and "DECnet interface status and configuration" are all allegedly copied by

Arista's use of "IP interface status and configuration." First, none of these protocols (AppleTalk,

CDP, CEF, and DECnet) are even supported by any Arista product: AppleTalk and DECnet are

obsolete protocols and CDP and CEF are Cisco-proprietary protocols. Second, the phrase "IP

interface status and configuration" is simply a short phrase using common Computer Science

terms and is so generic it can be found by a simple Google search on various non-Cisco

websites.[61] And yet Cisco appears to believe that its use of "AppleTalk interface status and

configuration" now enjoins every author outside of Cisco from using sentences containing

variations of these words. Prof. Almeroth's list of accused help descriptions runs a full 19 pages,

but is full of accusations of short text strings such as "Verify a file," "Source Ip Address", and

"End of range" that are generic and widely used outside of Cisco.

145.   I also found when searching Google for a few of the accused help text strings that

Dell's user names show the usage of the same accused text, including, for example, "Turn off

privileged commands" and "Turn on privileged commands." Again, Cisco's late identification

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[58] *See* http://www.inetdaemon.com/tutorials/networking/lan/arp.shtml
[59] *See* http://www.webopedia.com/TERM/S/subnet_mask.html
[60] *See* http://www.hallogram.com/sockettools/visual.html
[61] I encourage the reader to simply search for this phrase and notice the long list of non-Cisco references that appear.

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of these help descriptions has prevented me from undertaking a careful and full analysis, but

there is at least some evidence that the Dell CLI uses some of the same accused help text. *See,*

e.g.,

https://www.force10networks.com/CSPortal20/KnowledgeBase/DOCUMENTATION/CLIConfi

g/FTOS/TCS_Config_8.4.6.0_Apr-21-2014.pdf (Page 60).

146.   In every case where Prof. Almeroth cites to source code, either from Cisco or

Arista, he makes at best a vague reference to some functionality and then concludes that they are

"similar." But with no specific citation to source code alongside a principled analysis, it is

impossible to determine what, if any, basis Prof. Almeroth relies upon. At a minimum, Prof

Almeroth does not employ the methods one would normally follow to assess scientifically

whether any source code copying ever occurred.

147.   Beyond Prof. Almeroth's insinuations that source code was copied with respect to

the help descriptions, he goes further and notes what he believes are non-standard behaviors that

the Cisco CLI parser and the Arista CLI parser share. In total, he cites four examples of what he

believes are similarities between the Arista parser and the various Cisco parsers. In each case,

these similarities either do not exist, or do exist simply because that is how standard parsers

operate. Prof. Almeroth's observations are not based on a survey of Network Device CLI

parsers, after which he might have a principled basis for concluding that Arista's and Cisco's

parsers share some unusual similarities. Instead he has examined *only* Arista's and Cisco's

parsers and then made these conclusions. Of course any two CLI parsers are going to share

similarities: there is a standard theory of how to write a parser and this body of knowledge was

well-established long before Cisco existed. Prof. Almeroth does imply that he is familiar with

standard parser-construction techniques, because he states that the Cisco and Arista parsers do

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things that are "non-standard", meaning that he understands what is "standard." I disagree with

Prof. Almeroth, and contend that all of the behaviors he identifies in his Opening Report are

either misunderstood by him, or well within standard practice. I examine each one of Prof.

Almeroth's observations now.

148.

149.   I disagree with Prof. Almeroth's characterization of how the CLI operates on a

Cisco device versus on an Arista device. A very common case that occurs when configuring a

networking device via its CLI is the following: the user is in Privileged EXEC Mode and has the

"#" prompt. He/she then types "conf t" and enters Global Config Mode, intending to change the

configuration of the device. But then he/she wishes to issue a command that is valid only in

Privileged EXEC mode, such as "show ip interface brief". Attempting to do this from Global

Config Mode results in an error[62]:

```
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#show ip interface brief
                 ^
% Invalid input detected at '^' marker.
```

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[62] All tests shown here were conducted on my Cisco 3725 router using Cisco IOS 12.4(3)

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150.   The trick to get around this is to use the "do" prefix in front of the desired EXEC

Mode command. The "do" prefix allows the user to issue EXEC Mode commands from any

submode, including Interface submodes and the Global Config submode:

> Beginning in Cisco IOS Release 12.1(11b)E, EXEC-level Cisco IOS commands (such as **show**, **clear**, and **debug** commands) can be entered within any configuration mode (such as global configuration mode) by issuing the **do** command followed by the desired EXEC command. This feature provides the convenience of entering EXEC-level commands without needing to exit the current configuration mode.

(See

http://www.cisco.com/c/en/us/td/docs/ios/fundamentals/configuration/guide/15_1s/cf_15_1s_boo

k/feat-do_cmd.html)

151.   Using the "do" prefix we can now issue our desired "show ip interface brief"

command from within Global Config Mode[63]:

```
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#show ip interface brief
                  ^
% Invalid input detected at '^' marker.

Router(config)#do show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        unassigned      YES unset  administratively down down
FastEthernet0/1        unassigned      YES unset  administratively down down
FastEthernet1/0        unassigned      YES unset  up                    down
FastEthernet1/1        unassigned      YES unset  up                    down
```

152.   Prof. Almeroth notes that this is possible, but does not explain that Cisco requires

the use of the "do" prefix.

153.   Using the Arista CLI, the command just works: no "do" prefix is required, the

command just works[64]:

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[63] Run on Cisco IOS 12.4
[64] Run on vEOS 4.15.5M

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```
eos#conf
eos(config)#show ip interface brief
Interface              IP Address        Status      Protocol
Management1            10.0.2.19/24      down        down
```

154.   Note also that entering Global Config Mode was achieved by typing only "conf" instead of "conf t".[65] This is another convenience offered by the Arista CLI. I am not the first to notice this convenience: under the blog heading "Arista vs Cisco — The cool CLI differences", another user remarked on how he could not only avoid using the "do" prefix, but that the "tab expansion" feature worked for Arista but Cisco it does not[66]:

```
2 – Don't need the 'do' command to show config from configuration mode, we can just type
the 'show' command and can also be tabbed out, unlike the Cisco 'do' command


   sw03(config-if-Et10)#show ip rou
   sw03(config-if-Et10)#show ip route
   Codes: C - connected, S - static, K - kernel,
          O - OSPF, IA - OSPF inter area, E1 - OSPF external type 1,
          E2 - OSPF external type 2, N1 - OSPF NSSA external type 1,
          N2 - OSPF NSSA external type2, B I - iBGP, B E - eBGP,
          R - RIP, A - Aggregate

   Gateway of last resort:
    S      0.0.0.0/0 [1/0] via 10.5.8.254


    C      10.5.8.0/24 is directly connected, Management1
```

(See http://showroute.net/arista-vs-cisco-the-cool-cli-differences/).[67]

---

[65] "conf" is short for "configure" and is accepted as a valid abbreviation by both parsers. "conf t" is short for "configure terminal" which is required by Cisco CLIs but Arista EOS accepts just "configure" as an equivalent command but "conf t" will also work on Arista EOS. Prof. Almeroth himself takes advantage of this convenience by typing only "config" instead of "config t" in Almeroth Opening Report ¶ 208 and Exhibit Copying-7.

[66] Normally under Cisco's CLI, I can type "show ip int" and then hit the TAB key, and the CLI will expand the last word "int" to "interface" for me. However, if I type "do show ip int" and hit the TAB key, the CLI does not do this, unfortunately. Arista allows me to type "show ip int" and TAB words, even from Global Config Mode.

[67] Cached version of this web page is also available at http://webcache.googleusercontent.com/search?q=cache:nasD13cYWmUJ:showroute.net/arista-vs-cisco-the-cool-cli-differences/+&cd=2&hl=en&ct=clnk&gl=us.

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155.   ██████████████████████████████████████

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156.   ████████████████████████████

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157.   Although I have not reviewed details of how the Cisco and Arista parsers handle their "end of line" tokens, what Prof. Almeroth describes sound reasonable. Most parsers set some kind of "endmarker" to demarcate the end of input. This is an old convention: I was able to find over 100 papers before 1980 containing "parser" and "endmarker" using Google Scholar. I cite two representative sources here. First, from the "Dragon Book"[68] there are various passages talking about setting an "endmarker" with either a "#" or "$" to indicate the end of input; here is one example:

---

[68] The book "Compilers: Principles, Techniques, and Tools" by Aho, Sethi, and Ullman (Jan 1, 1986) is often considered the "bible" for parser technology. It is often called "the dragon book" because the cover depicts an armor-wearing knight sitting at a computer with a dragon poking its head through the monitor. It was produced with Bates number ARISTANDCA00001453.

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> A table-driven predictive parser has an input buffer, a stack, a parsing table, and an output stream. The input buffer contains the string to be parsed, followed by $, a symbol used as a right endmarker to indicate the end of the input string. The stack contains a sequence of grammar symbols with $ on the bottom, indicating the bottom of the stack. Initially, the stack contains the start symbol of the grammar on top of $. The parsing table is a two-dimensional array $M[A, a]$, where A is a nonterminal, and a is a terminal or the symbol $.

(See the Dragon Book, Sec 4.4, Syntax Analysis, p. 186)

158.   Another useful reference is the book "Yacc: Yet Another Compiler Compiler" by Steve Johnson (who also wrote the "yacc" program familiar to Unix users).[69] yacc is a program that accepts grammars, in a certain standard format, and outputs a working parser written in C that can then be integrated into a larger program. From the Yacc book:

> The end of the input to the parser is signaled by a special token, called the *endmarker*. If the tokens up to, but not including, the endmarker form a structure which matches the start symbol, the parser function returns to its caller after the endmarker is seen; it *accepts* the input. If the endmarker is seen in any other context, it is an error.

(See http://www.isi.edu/~pedro/Teaching/CSCI565-Spring11/Materials/Yacc.pdf, p. PS1:15-4)

159.   ██

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[69] *See* S. Johnson, "Yacc: Yet Another Compiler Compiler," *AT&T Bell Laboratories Technical Reports*, AT&T Bell Laboratories Murray Hill, New Jersey 07974, (32), 1975.

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165.

166.

B.   _Prof. Almeroth ignores the fact that the asserted aspects of the Cisco IOS CLI comprise a very small portion of the entire operating system._

167.   In his Opening Report, Prof. Almeroth talks about the engineering effort and financial investment made by Cisco in the development of IOS, as well as how critical the

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[70] In fact, "EOS" stands for "Extensible Operating System"

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operating system is to the company (Almeroth Opening Report ¶¶ 42-43). However, Prof.
Almeroth fails mention what portion of IOS is related to the asserted functionalities at issue in
this litigation. I have written several CLIs in my career as a programmer and the machinery
required to implement the type of industry standard CLI described above in this Report is
perhaps a few thousand lines of code (this includes all the behaviors, commands, hierarchies,
modes, prompts and command responses). The real work lies in the actual implementation of the
underlying functionality that occurs without user interaction. This is especially true in a
networking device whose primary tasks involving moving packets, applying security rules,
adjusting to congestion, recovering from faults, logging statistics, interacting with the other
interfaces (such as NETCONF or OpenFlow or other non-CLI specific technologies), and so
forth. All of these critical tasks take place at extremely high speeds and do not involve
interacting with the operator.

168.   Writing a network operating system like IOS usually takes place as follows: the
first implementation requires writing the CLI, including all functional behaviors along with the
initial commands, hierarchies, modes, prompts and responses in the first implementation. Then
all functionality must be added to implement those initial CLI commands. Already, the code
supporting functionality will take more time and comprise more code than the code required for
the CLI itself. As time passes, more features will invariably be added to the operating system.
However, the CLI will require very little additional effort to support the new commands
provided the CLI has been written in a way that readily allows features to be added[71]. But the
functionality for the new feature will most likely not be a simple extension to an already-existing

---

[71] Writing code in a way that allows it to be modified, debugged, extended, understood by others, reused by others,
etc., is all wrapped up in a Computer Science discipline called "Software Engineering." This is usually a mandatory
course in most Computer Science curricula. Some programmers, researchers and a few companies specialize in just
this discipline.

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body of code, but rather will require an implementation built from scratch. Therefore the amount

of effort and the amount of additional code for the functional implementation will outstrip the

amount of effort and amount of code for the CLI extension by a very large degree, far more than

occurred with the initial implementation. I base the foregoing on my experience and training,

but it does accord with the testimony offered by engineers at Cisco who have implemented new

features in IOS. *See* Opening Report ¶¶ 596-598.

169.

170.

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[72] This counts all *.py files containing "Cli", "Rule" or "Pars" in their filename in the site-packages directory, as well as all *.py files in the CliMode, CliPlugin, CliSavePlugin, and CliTestMode directories. This is intended to capture the code that implements the parser, hierarchies, modes, prompts, responses and help descriptions, but excludes the code that implements the underlying functionality invoked by CLI commands.

[73] Mr. Schulman analyzed IOS 12.0.22S, IOS 12.4.22T, and NX-OS 5.2.1.

[74] He included all files and directories that included "pars" and/or "cli" in their names as part of the CLI.

[75] He included all files with extension c, h, java, html, xml, cpp, mk, S, cfg, conf, exp, sh cc, tcl, nmake, cmd, jsp, css, reg, sax, inc, def, xsl, asm and patch.

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171.
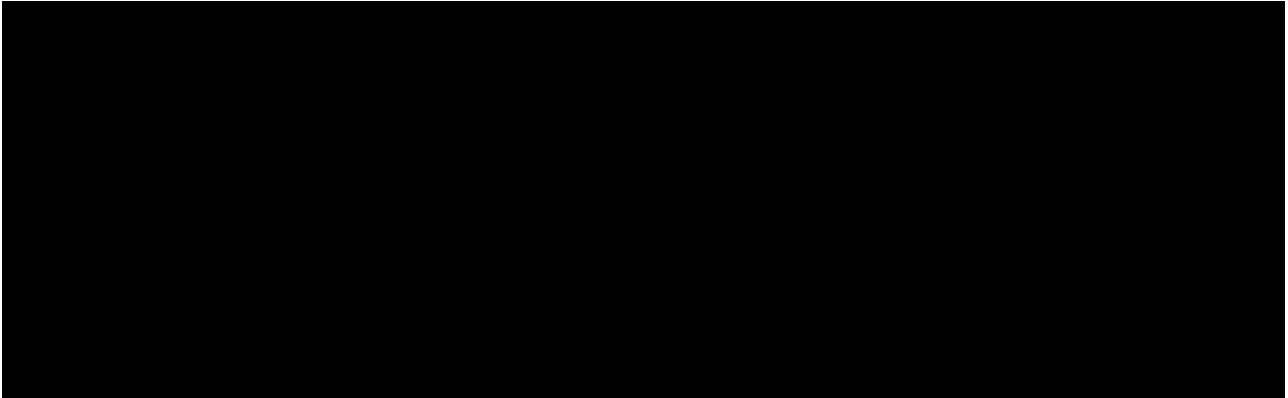
172.   This is a common theme in every CLI I have ever seen: the code required to

implement the CLI is a tiny fraction of the code for the full software product. This is true of the

CLIs I wrote in the 1970s and 1980s, true of the open-source CLI code I have reviewed (such as

ftp, mysql, and Linux), and true of the commercial product I worked on (the Ingres database,

which had a CLI). While Prof. Almeroth's assertions about the engineering efforts and

economic investments are interesting, they pertain to *all* of IOS, not just the tiny fraction of IOS

that implements the CLI. Moreover, the asserted command abstractions in this case are in turn a

tiny fraction of the command abstractions Cisco claims its CLI supports. *See* Opening Report ¶

692 (where I estimate that the total number of asserted CLI command abstractions is less than

3.3% of the overall total, using Cisco's own numbers). Therefore, as substantial as Cisco's

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investments in the full IOS product may be, the asserted commands comprise less than 0.1% of that product[76].

> ### C.   *Prof. Almeroth could not have verified that each of the accused "command expressions" were supported by the Arista EOS CLI.*

173.   Prof. Almeroth states that he "inputted commands into working versions of Arista's switch running EOS" and that when he "input the commands, the Arista switch running EOS provided an output or response (not an error message) with the same look and feel as if I had inputted the commands into a Cisco device, which tells me that the multi-word command expressions are used in Arista's EOS in precisely the same way as they are in Cisco's IOS, and that a user would have a hard time knowing they were using an Arista switch instead of a Cisco switch." Almeroth Opening Report ¶¶ 173-174. Prof. Almeroth then states that he provided a "log confirming my testing" as Exhibit Copying-7.

174.   I have reviewed the documents provided by Prof. Almeroth as part of this Exhibit Copying-7, and I see only a few text files ("arista-7010.txt", and "arista-7554.txt") that show a handful of commands entered into an Arista EOS CLI.[77] For example, "arista-7010.txt" shows only the outputs of the following commands entered into the CLI (software image version EOS 4.14.9.1M): "en" (shorthand for enable), "show version", show version detail", "config", "snmp-server user tech-1 tech-sup v3", "exit", "show snmp", "show ip route", "show ip igmp snooping", "show interface ethernet 1", "router ospf 2", "network 10.0.0.0 0.255.255.255 area 0", "router-id 10.0.0.1", "show ip ospf", "show vlan 1", "show vlan summary", "interface

---

[76] I am taking 3% and multiplying by 3.3% to get 0.099%, which is less than 0.1%

[77] Exhibit Copying-7 to the Almeroth Opening Report includes a file called "arista.txt", but it does not appear to be a log file at all. Instead, it appears to show the functionality of the context-specific help system in a CLI, but Prof. Almeroth does not provide any indication of how he generated the outputs in that file.

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Ethernet 1", "switchport port-security", "switchport port-security maximum 2", "show port-security", "show spanning-tree", and "show spanning-tree vlan 1 detail".

175.   Similarly, "arista-7554.txt" shows only the outputs of the following commands entered into the CLI (software image version 4.14.5.1F-SSU): "show version", show version detail", "en" (shorthand for enable), "config", "snmp-server user tech-1 tech-sup v3", "exit", "show snmp", "show ip route", "show ip igmp snooping", "show interfaces Ethernet 3/1/1", "router ospf 2", "network 10.0.0.0 0.255.255.255 area 0", "router-id 10.0.0.1", "show ip ospf", "show vlan 1", "show vlan summary", "interface Ethernet 3/1/1", "switchport port-security", "switchport port-security maximum 2", "show port-security", "show spanning-tree", and "show spanning-tree vlan 1 detail".

176.   Based on these logs provided as part of Exhibit Copying-7 to the Almeroth Opening Report, Prof. Almeroth's analysis of the "look and feel" of the Arista EOS CLI, and his conclusion "that the multi-word command expressions are used in Arista's EOS in precisely the same way as they are in Cisco's IOS, and that a user would have a hard time knowing they were using an Arista switch instead of a Cisco switch", is based on his entering a total of 22 CLI commands into the EOS CLI (several of which, like "enable", "config", and "exit", are not even accused in this lawsuit). In other words, of the 508 CLI command abstractions that Cisco accuses Arista of copying, Prof. Almeroth did not test 489 of them on the Arista EOS CLI (or at least discloses no evidence or basis of such testing). I do not believe that Prof. Almeroth, after testing less than four percent of the accused CLI command abstractions on an Arista EOS CLI, has any basis to conclude that "the multi-word command expressions are used in Arista's EOS in precisely the same way as they are in Cisco's IOS, and that a user would have a hard time knowing they were using an Arista switch instead of a Cisco switch."

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177.   I also note that the log files provided by Prof. Almeroth ("arista-7010.txt", and "arista-7554.txt") illustrate my opinion that the accused command extractions are ***not*** syntactically valid and complete CLI commands, and that when the valid Arista EOS CLI commands are actually examined, many of them are very different from what has been accused by Cisco in this litigation. For example, "snmp-server user tech-1 tech-sup v3" and "network 10.0.0.0 0.255.255.255 area 0" are very different from the asserted and accused command abstractions "snmp-server user" and "network area." Had Prof. Almeroth performed this exercise for all 508 accused command abstractions, it should show that the text that is actually entered into and accepted by the Arista EOS CLI is, in most instances, different from what is shown in the list of accused command abstractions. This is illustrated more fully in **Appendix N**, which shows the full documented Arista EOS command syntaxes for the accused command abstractions. In addition, the log files provided by Prof. Almeroth show that the EOS command prompts are not simply "switch#" or "switch(config)#" but are actually specific to the device (*e.g.*, "localhost(s1)#" in "arista-7554.txt" and "localhost#" in "arista-7010.txt").

178.   Moreover, I strongly disagree that the accused multi-word command abstractions are used in Arista's EOS in "precisely the same way" as they are in Cisco's IOS, and that a user would "have a hard time knowing they were using an Arista switch instead of a Cisco switch." *See* Almeroth Opening Report ¶¶ 173-174. As explained in detail in my Opening Report, Arista's products have several innovative features that distinguish it from competing products, including Cisco IOS, and those differences support my already stated opinions regarding fair use and, in particular, transformative use. *See* Opening Report ¶¶ 126-168 (technical description of Arista EOS and its various innovations), ¶¶ 672-680 (discussing the fair use doctrine). Given those many differences, I disagree that a user of an Arista switch would have a "have a hard time

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knowing they were using an Arista switch instead of a Cisco switch" as Prof. Almeroth asserts.

The accused multi-word command abstractions are also ***not*** used in Arista's EOS in "precisely

the same way" as they are in Cisco's IOS. Indeed, as shown in **Appendix N**, above, a large

number of the accused command abstractions are not valid commands that are "used" in Arista

EOS to begin with.

> D.   *Prof. Almeroth did not provide any evidence or criteria when determining that the CLIs of other vendors are "different" from Cisco's CLI, nor does he explain why the differences between the Arista CLI and the Cisco CLI do not qualify as "different" as well*

179.   In ¶ 119 of his Opening Report, Prof. Almeroth claims that other vendors offer

different CLIs with different commands: "[...] the fact that there are other competitors in the

market that implement different CLIs—e.g., Juniper Networks, HP, Brocade, Alcatel-Lucent,

and Extreme, among others—with different commands [...]". However, Prof. Almeroth does not

explain the analysis used to measure the degree of difference between the Cisco CLI and each of

the exemplary vendor CLIs he lists, nor does he explain what these "different commands" are

that he identified and why these different commands were sufficient to reach his conclusion that

the CLIs were different. There are indisputably different commands between the Cisco CLI and

the Arista CLI, but Prof. Almeroth does not explain why he (presumably) does not consider these

"different commands" enough to conclude that the Cisco CLI and Arista CLI are different as

well.

180.   If Prof. Almeroth considers the exemplary vendor CLIs listed above (*i.e.*, Juniper,

HP, Brocade, Alcatel-Lucent, and Extreme) sufficiently "different" from the Cisco CLI, then one

can presume that Prof. Almeroth agrees that the overlap in command abstractions, hierarchies,

command modes, and command prompts between each of the listed vendor's CLIs and Cisco's

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CLI (as shown in the Appendices to my Opening Report, the Amended Appendices to this rebuttal report, and in the body of my Opening Report) would not be sufficient to constitute copyright infringement.

> ### E. *Prof. Almeroth has not provided any evidence to show contributory or vicarious copyright infringement liability.*

181.   I am informed and understand that a requirement for a claim of indirect infringement is the existence of direct infringement. For all the reasons stated above and in my Opening Report that support a finding that there is no direct copyright infringement, including my opinions supporting a conclusion of no copyrightability and the applicability of various copyright defenses, it is my opinion that there can be be no indirect infringement.

182.   Moreover, to the extent Prof. Almeroth concludes that indirect infringement is shown by customers (*e.g.* end-users of switches and routers) simply using CLI commands, command modes, command prompts, hierarchies, and command outputs that are similar to those supported by Cisco's switches and routers, the same conduct would also be happening by the customer's use of virtually every other competitor's networking equipment, as shown in my analysis of competitor equipment in my Opening Report. *See* Opening Report at pp. 75-238. Prof. Almeroth does nothing to try to distinguish the alleged infringement by way of customers using those competitor CLIs from the alleged infringement he alleges occurs through Arista's products.

183.   Finally, as explained in my Opening Report, Cisco enables its customers to use Cisco-competitor CLIs by way of the CiscoWorks Network Compliance Manager (NCM) product and the Cisco Network Services Orchestrator (NSO) product. *See* Opening Report ¶¶ 441-483. Thus, Cisco apparently believes it is either not copyright infringement at all, or is fair use, for customers to use, for example, a Juniper-style CLI in the NSO product without paying

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Juniper any compensation for use of that feature, and make other uses of third-party CLI commands (including Arista, Dell, Foundry, HP, Huawei, and Juniper CLI commands) as described in my Opening Report without paying those third parties for such use of those CLI commands. *Id.* The same rules would apply to Arista customers, to the extent they use CLI elements that Cisco claims as its own. For those additional reasons, I disagree with Prof. Almeroth's opinions regarding indirect infringement.

XI.   CONCLUSION

184.   In conclusion, for the reasons stated here, Prof. Almeroth has not, in my opinion, set forth a basis for concluding that Arista has infringed any of Cisco's asserted copyrights. Nor has Prof. Almeroth set forth any basis undermining my conclusions about Arista's defenses, such as fair use and copyright misuse. As noted, I may prepare demonstratives to illustrate the opinions I express here and the factual bases for them.[78]

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[78] As noted throughout this report, these opinions are based upon the information available to me gathered during discovery. Should Cisco provide further facts or documents or testimony, and/or should Cisco be permitted to assert its late disclosed theories regarding "Help" text copying (which I understand the Court will decide), I will consider those additions in due course to the extent they are relevant to my analysis.